

ANNUAL MEETING
Canadian Medical Association
June 18 to 22, 1934
ANNOUNCEMENT ON PAGE 677
CALGARY

JUN 11 1934

The Canadian Medical Association Journal



THE OFFICIAL ORGAN OF
THE CANADIAN MEDICAL ASSOCIATION
AND ITS AFFILIATED PROVINCIAL MEDICAL ASSOCIATIONS

PUBLISHED MONTHLY BY
THE CANADIAN MEDICAL ASSOCIATION
3640 UNIVERSITY STREET, MONTREAL

[PRICE SEVENTY-FIVE CENTS PER COPY]

[COPYRIGHTED]

BARKER

TREATMENT OF THE COMMONER DISEASES

\$3.50

By LEWELLYS F. BARKER, M.D.

Professor Emeritus of Medicine, Johns Hopkins University

CONTENTS. I. Advances in the Methods of Studying Patients. II. On Some of the Commoner Infectious Diseases. III. Commoner Disorders of the Respiratory System. IV. Commoner Disorders of the Circulatory System (Heart and Blood Vessels). V. Commoner Diseases of the Blood and of the Blood-building Organs. VI. Commoner Diseases of the Digestive Apparatus. VII. Commoner Diseases of the Kidneys and Urinary Passages. VIII. Commoner Diseases of the Locomotor System. IX. Commoner Nervous and Mental Diseases. X. Commoner Diseases of Metabolism and of the Endocrine System. Octavo, 319 pages.

COMMENT: "THIS IS THE BEST WORK ON THERAPEUTICS THAT HAS APPEARED FOR MANY YEARS," *Canadian Med. Association Journal*.

**OPERATIVE
GYNECOLOGY**By PEHAM and AMREICH
University of Vienna.**JUST ISSUED**

The most beautifully and extensively illustrated work ever offered. Operations are shown STEP BY STEP—clearly in colors—as carried out at the operating table.

800 Pages, ATLAS SIZE, 441 Illustrations—Mostly in colors—2 Vols.

\$26.00

LIPPINCOTT'S QUICK REFERENCE BOOK FOR MEDICINE AND SURGERY.

\$16.50

New—ninth edition JUST OFF THE PRESS.

This work is made on a plan that has not been done before. It is a library in one volume. There is nothing quite like this book in existence.

You can get any or all of the above works
and state your own terms of payment.

See our complete exhibit of books at the Canadian
Medical Association Convention, Calgary, in June.

REQUEST A COPY OF OUR NEW 1934
MEDICAL CATALOG

SOLOMON—Materia Medica and Therapeutics for
Nurses—Just Issued.

\$3.50

J. B. LIPPINCOTT COMPANY, PUBLISHERS

525 CONFEDERATION BUILDING - - MONTREAL

A COMBINATION of all of the active derivatives of the pancreas which control carbohydrate metabolism together with the specific proteins necessary for regeneration of the pancreatic tissues.

TRYPSOGEN



Supplied with Enterosol Coating to insure the passage through the stomach for immediate absorption in the intestine.

Bottles of 100, 500 and 1000 tablets.

Plain or Enterosol Coated.

●
G. W. CARNRICK CO., LTD.

20 Mt. Pleasant Ave.

Newark, N. J.

The Canadian Medical Association Journal

Vol. XXX

TORONTO, JUNE, 1934

No. 6

THE INFLUENCE OF THE DIENCEPHALON AND HYPOPHYSIS UPON GENERAL AUTONOMIC FUNCTION*

By WILDER PENFIELD,

Montreal

WITH the invitation to prepare this teaching lecture came the stern injunction that I was to speak plainly, in simple language — and yet the subject proposed is neither plain nor simple; a subject which at the present time is firing the imagination of physiologist and chemist, of prophet and of charlatan.

Hidden away in the mysterious hollow of the sella turcica lies a miracle-working gland whose reputed performances would have brought a blush of shame to the swarthy cheek of Aladdin. He never thought of trying to produce acceleration of growth, of sex function, of metabolism, and of water drinking, or of suddenly inhibiting these processes. It did not occur to him that by rubbing up one side of his lamp he might summon an increased sugar tolerance, and by rubbing down the other side, diabetes mellitus.

But this pituitary "lamp of Aladdin", as it hangs at the bottom of the infundibulum, is not an isolated organ like other glands. Its posterior lobe is continuous with the infundibulum and with the diencephalon, that part of the brain which surrounds the third ventricle and includes potent autonomic centres. These centres, unobserved and unsuspected, have always regulated the vital processes of the body through peripheral sympathetic and parasympathetic pathways. Far from being isolated from the diencephalon it is now claimed that the hypophysis is connected with it by a portal circulation of veins, and we suspect, further, that certain chemical principles distilled within the hypo-

physis may pass directly through the nervous tissue and into the third ventricle, there to bathe the paraventricular centres.

The most obvious pathological condition of the anterior lobe is neoplastic change, and examples of these neoplasms will serve most easily to recall to your minds certain of the functions normally discharged by this doughty little gland. The mother cells, or chromophobe cells, of the anterior lobe differentiate into acidophilic and into basophilic cells, and, correspondingly, tumours of three types have been described, *i.e.*, chromophobe, acidophilic (or eosinophilic) and basophilic adenomas.

CLINICAL HYPOPITUITARISM

The most frequently encountered tumour of the pituitary is the chromophobe adenoma. In my opinion the cells of this tumour are not identical in appearance with the true mother cells of the anterior lobe. They differ morphologically, but we need not tarry to quarrel with terminology. At all events these tumours seem to produce no hormone of themselves, but by their slow expansion within the sella turcica they gradually destroy the hypophysis, just as a craniopharyngeal pouch epithelioma may do from without the sella.

The resultant symptoms of this destruction are usually, first, gonadal. If the patient be a woman menses cease, perhaps years before other signs appear. Sexual activity in the male is interfered with at a later stage. Experimental hypophysectomy in animals results also, of course, in suppression of the oestral cycle and in atrophy of testicular germinal epithelium. Hypopituitarism is thus best seen in such cases

* The Carpenter Lecture, New York Academy of Medicine, November 2, 1933.

Read in part before the Annual Meeting of the Royal College of Physicians and Surgeons of Canada, Ottawa, November 27, 1933.

of partial destruction of the hypophysis and is manifested by decrease or disappearance of secondary sex characteristics, a pasty complexion, and the appearance of fat, and is associated with decreased basal metabolism and arterial hypotension, which is related no doubt to the atrophy of thyroid and of adrenal cortex demonstrable at post-mortem examination. Hypopituitarism in childhood produces the adiposogenital dystrophy of Fröhlich¹⁹ which was really first described by Babinski.¹

CLINICAL HYPERPITUITARISM

Chromophile or acidophilic adenomas, on the other hand, evidently elaborate a substance capable of producing the growth changes familiar to all students of medicine as *acromegaly*. When such tumours begin before maturity typical acromegalic giants are produced. If they make their appearance later this caricature of growth is superimposed upon the adult frame. The presence of these acidophilic cells is apparently invariable in the tumours associated with acromegaly. This fact may cast some light upon the acidophilic cells of the functioning gland.

Hypophysectomy in immature animals arrests growth almost immediately. That growth is really controlled by the anterior lobe is further borne out by the fact that a purified growth hormone has been isolated from the anterior lobe by Collip, Selye and Thomson¹³ and by Evans¹⁸ and his co-workers. Furthermore, Evans points out that administration of this principle, if pushed after closure of epiphyseal lines, is capable of producing acromegaly in dogs, as previously shown by Putnam, Benedict and Teel.³²

The third type of adenoma is less easily assessed for its true value at the present time, *i.e.*, the basophil adenoma described by Cushing.¹⁴ These adenomas, which are usually small, produce their effect, according to Cushing, in part directly by migration of adenomatous basophilic cells into the parasympathetic centres in the vicinity of the third ventricle, and in part through the local circulatory pathways. The neurotropic effect is said by him to be adiposity, hypertension and late vascular hypertensive changes. The patients (see Fig. 1) have an over-development of secondary sexual characteristics, become hirsute, and show striations in

the skin from the rapid addition of subcutaneous fat.

Pituitary basophilism may be, and has been, confused with hyperadrenalism, leading in several cases to exploration of the adrenal glands, and indeed adenomas of the adrenal cortex have been encountered. It is not possible at the present time to make the assumption that the similar basophil cells of the pituitary concern themselves principally with the elaboration of a sex hormone or with the activation of parasympathetic mechanisms. Nevertheless, Cushing has called attention to a most impor-



FIG. 1.—A case of verified basophilic adenoma of the pituitary. (Kindness of Professor H. Cushing; pictured by him as the Kraus-Raab case.)

tant group of cases in which there is evidently a polyglandular disturbance the initiating factor of which may well be the basophil adenoma. But neoplastic cells usually differ from normal cells in activity as in growth, and, in general, tumours of the pituitary gland are prone to produce a kaleidoscopic effect upon patients. This may be due to over-secretion of certain cells, followed by under-secretion when the neoplastic compression increases. And this explains the finding of "fugitive acromegaly", of transient diabetes mellitus, of fleeting hyperthyroidism, of acromegalic giants who show late tendency to "adiposo-genital dystrophy".

CLINICAL APITUITARISM

Epitheliomas of the craniopharyngeal pouch most often produce hypopituitarism with adiposo-genital dystrophy early in life, as they press down into the sella turcica, gradually destroying its contents. They may go further to practical destruction of the gland, resulting in the hypopituitary dwarfism of childhood and in the pitiful emaciated adult sufferers from so-called Simmonds' disease (Figs. 2-a and 2-b). Experimental hypophysectomy fully bears out the findings of clinical hypopituitarism, and Smith has described a cachexia resembling that of Simmonds' disease which is produced by experimental hypophysectomy.

ANTERIOR PITUITARY EXTRACTS

A clearer picture of the activity of the anterior pituitary lobe (perhaps a little too clear!) is emerging from the studies of the biochemists, who have now isolated (1) a thyrotropic principle and (2) an adrenotropic extract. In substantiation of this, some clinical evidence is also at hand that overactivity of the pituitary is associated with hyperplasia of the thyroid and of the cortex of the adrenal, and, conversely, that hypopituitarism is associated with atrophy of these glands. The increased metabolism usually associated with an active chromophile adenoma of acromegaly has as its probable cause increased activity of the thyroid, while the low basal metabolism and low blood pressure of hypopituitarism may well have deficient activity of thyroid and adrenal as their immediate cause. Biochemists have further isolated (3) a growth extract, (4) a lactogenic hormone, (5) a gonadotropic element and (6), possibly, a diabetogenic principle.

These elements express most clearly the multiform activity of the normal functioning anterior lobe, but their separation does not necessarily indicate the existence of such hormones circulating in the blood. Collip¹²

suggests that the number of true hormones in the gland is very limited, that in the process of extraction certain active groups are released from "a master protein molecule". Clinicians, he concludes, will have to use not one, but various combinations of these active substances as indicated in the particular case. Professor Collip evidently does not dream how deeply rooted in the hearts of certain clinicians, who may be described as *adenotropic*, was the prac-

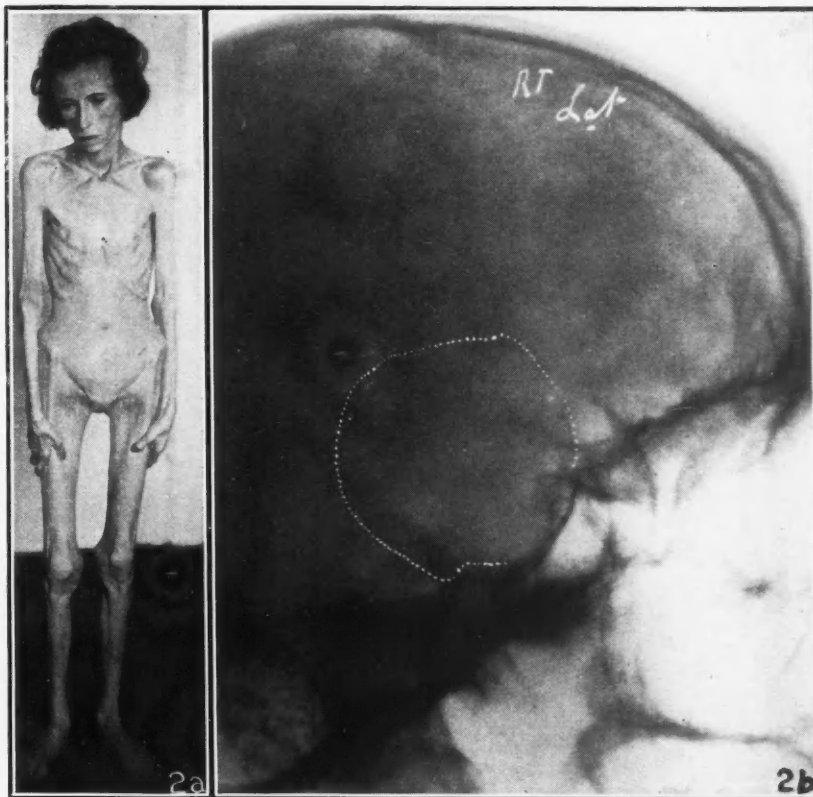


FIG. 2-a.—A case of pituitary cachexia (Simmond's disease) due to tumour shown in Fig. 2-b. It was considered that she represented complete apituitarism, but at necropsy, done at the Montreal General Hospital, Professor Rhea found that a very small flattened remnant of the hypophysis was still present.

FIG. 2-b.—The same case as in Fig. 2-a. The dotted outline indicates the partially calcified capsule of a craniopharyngeal epithelioma.

tice of administering not one but many extracts long before true extracts existed.

THE DIENCEPHALON

The diencephalon* (called also interbrain or "tween" brain), surrounding as it does the third ventricle and including thalamus, hypothalamus and infundibulum, is a very old portion of the brain, being well developed in the lowest vertebrate forms which possess little or

* Excellent analyses of autonomic representation within the brain have been provided by Greving,²⁰ by Huber and Crosby,²⁵ and, most recently, by Beattie⁵ and Josephy.²⁷

no forebrain. Without daring to stop for a detailed anatomical discussion I may point out only that lying beneath the walls of the third ventricle are supraoptic nuclei and nuclei of the tuber cinereum (Fig. 3—S and T) which seem to be closely associated with the posterior lobe of the pituitary, being connected with each other by afferent and efferent fibres. This complex Beattie⁵ has labelled the anterior mechanism. He might perhaps have borrowed from Cushing the term "neurohypophyseal" mechanism. There is some evidence that this anterior group of nuclei may deserve the adjective "para-

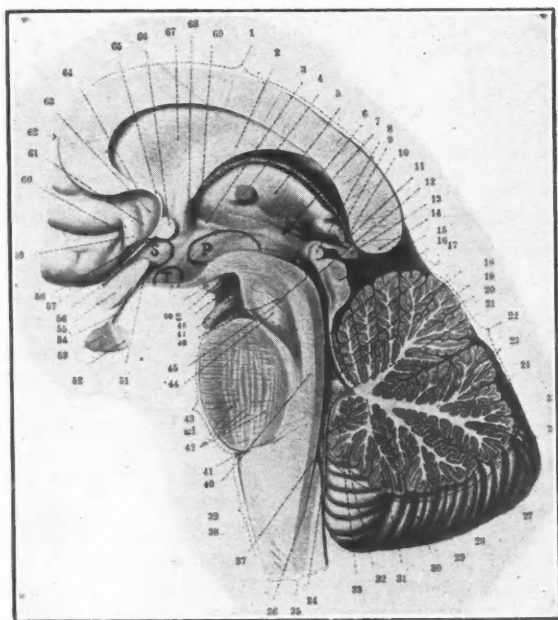


FIG. 3.—Diencephalon after Sobotta (Atlas of Anatomy). S—supra optic nuclei; T—tuberal nuclei; P—posterior hypothalamic nuclei, as indicated by Beattie.

sympathetic" because of the relationship of the tuberal nuclei to the craniosacral division of the autonomic nervous system with its peripheral control through vagus and pelvic nerves.

The posterior group of nuclei (P, Fig. 3) located in the walls of the posterior portion of the third ventricle above the corpora mammillaria are said to contain the sympathetic centres. Efferent tracts, composed of short neurones which pass downward through brain stem and cord, are assumed for both anterior and posterior complexes, but in the case of the posterior group a sympathetic pathway was actually followed by Beattie, Brow and Long⁷ from this region down the posterior longitudinal bundle and cervical cord, through the second, third and fourth thoracic anterior roots to the stellate ganglion and thence to the heart. The afferent

tracts so far demonstrated to these centres are chiefly derived from the diencephalon and from the forebrain. It seems somewhat surprising that the afferent pathways should come from "headward" regions. It may be that forebrain and thalamus form stations on the pathway from periphery to hypothalamic centres, but it is also evident that what may be considered afferent impulses reach these centres through the blood stream. For example, if the blood entering the thalamus be raised above the normal temperature there is a response from the nervous mechanism in the vicinity which results in a discharge, chiefly parasympathetic, which lowers the general temperature by sweating, vasodilatation and diminished oxidation.

Attention must be called also to the existence of a portal system of veins which is said to pass upward from both anterior and posterior lobes of the hypophysis through the infundibulum (Popa and Fielding;³¹ see also Basir, 1932), where they break up into a secondary distributing net beneath the infundibular recess of the third ventricle. Further, a colloid substance has been described in these veins by Collin,¹¹ also by Popa and Fielding,³¹ and by Cushing.¹⁶ If this proves to be true much of the hormonal material from the pituitary may act directly upon the nervous system. But Espinasse¹⁷ has most recently urged that these vessels are arteries, not veins, and fails to find colloid material in them. There is, in any case, a partial drainage into the general circulation by way of the cavernous sinus, which is derived chiefly from the sinusoids in the anterior lobe. Innervation of the posterior lobe is by nerve fibres from supra-optic and tuber nuclei, while the anterior lobe is innervated by fibres derived from the carotid plexus (Dandy).

CASE 1

In January, 1928, I was fortunate enough to have under my care at the Presbyterian Hospital in New York a patient with a small, discrete, encapsulated tumour so placed that it impinged upon the anterior and superior portion of the thalamus of each side (shown in Fig. 4). She was subject to recurring seizures which resembled epileptic attacks, excepting that the manifestations of the attack were confined to the realm of the autonomic nervous system. The case was published under the heading "Diencephalic Autonomic Epilepsy".

Now, an epileptic discharge is a gross revelation of the function of an area, somewhat in caricature no doubt, but the true features of function are there to be scanned (Jackson²⁶) by him who can read. The epileptic phenomena

which I shall recount in order of their habitual appearance may therefore reveal to us the function of this region. We may think of the disturbance spreading downward and backward from the tumour site.

1. Prodromal restlessness and sometimes a desire to void.
2. Sudden intense dilatation of skin of face, arms and breasts. Sudden rise in the blood pressure from 110 up to 200.
3. Lacrimation; diaphoresis; salivation; dilatation (or contraction) of pupils; protrusion of eyes (not invariably present); increase of rate and of pressure of pulse; marked retardation of respiratory rate; elicibility of pilomotor reflex.
4. Disappearance of superficial blush and fall of blood pressure; slowing and weakening of pulse.
5. Hiccups (from 3 to 5 in number).
6. Transient shivering.

During the present year I have had under my care at the Royal Victoria Hospital 3 other patients who showed certain features of autonomic epilepsy. One of these may be mentioned here.

CASE 2

A woman of 29, with a tumour involving the under surface of the left temporal lobe and extending to the midbrain and thalamus. She had had recurring slight attacks consisting of sudden headache, followed by yawning and hiccuping and sometimes associated with patchy erythema in different areas of the body. There was one attack of greater severity, characterized by a rise of blood pressure to 200 over 90, whereas the usual level approximated 100 over 70. With this there was a simultaneous rise of the pulse rate to 130, flushing and appearance of irregular erythema over the chest and thighs, spontaneous appearance of "goose flesh", slowing of the respirations to 4 per minute, salivation, lacrimation, dilatation of the left pupil, and contraction of the right.

This description tallies sufficiently with the first to make it clear that we are not dealing with a discharge of a parasympathetic system alone, as Cushing¹⁵ concludes in reviewing the first case. It is an explosive, indiscriminating, discharge which betrays the spatial relationships both of parasympathetic and sympathetic function. The dilatation of the peripheral vessels and sweating might be considered as parasympathetic in nature, but the pilomotor response and increased pulse rate, increased blood pressure, and protrusion of the eyes obviously belong in the sphere of the sympathetic. Another instance may be cited.

CASE 3

In the case of a boy of 14 I approached a tumour of the third ventricle through the right lateral ventricle under nupercaine analgesia. Taking hold of the tumour

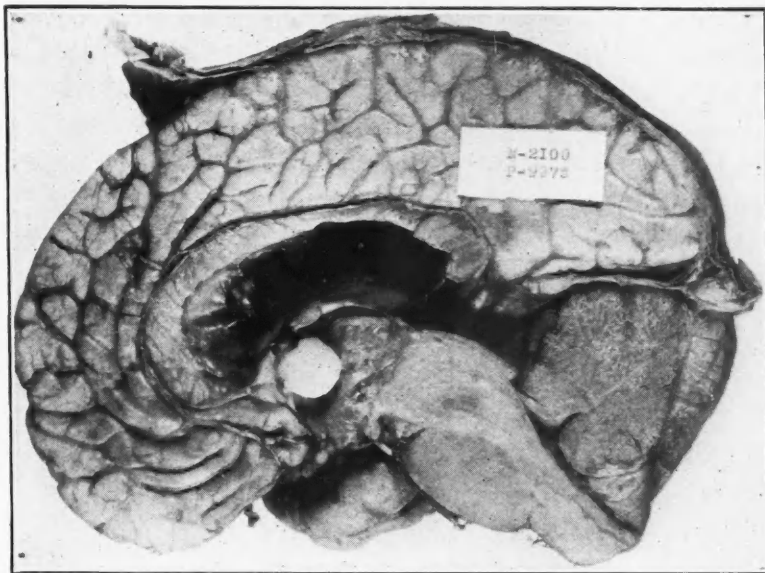


FIG. 4.—An encapsulated tumour compressing the anterior portion of thalamus of both sides and causing diencephalic autonomic epilepsy (from Penfield, 1929).

as it presented in the foramen of Monro I moved it within the third ventricle. The patient "hummed" and then vomited in a projectile manner, after which there was generalized shivering, followed by sudden frantic scratching of the inner aspect of the left thigh and there appeared very marked reddening of that skin area.* Following this he became disoriented as to place. His temperature rose from 99° at the time of the shivering to 102° an hour and a half later. This boy returned to our clinic last week, nine months after operation, complaining of generalized urticaria. His papilloedema had disappeared and he seemed well in other ways.

In the light of the operative findings and the sudden erythema seen at operation it seems justifiable to suggest that his urticaria is due to some recurrence of the tumour in the wall of the third ventricle. It will be noted in the illustration (Fig. 5) that the tumour has also produced in him a tendency to adiposo-genital dystrophy.

It is recognized that the urticarias and the general reaction, for example after serum injection, do not occur if the patient is anaesthetized. It may well be that such reactions proceed from the autonomic centres which I have described.

The conclusion to be drawn from these cases of autonomic epilepsy is that there are represented in the diencephalon blood pressure control, heart rate control, vascular dilatation, sweating, salivation, lacrimation, control of respiration, pilomotor reactions, shivering, hic-

* Next morning the patient's skin was scratched with great vigour for four minutes. There appeared no reddening of the skin comparable to that just described. It is evident that the erythema was not simply secondary to the scratching.

cuping and yawning, and perhaps micturition and the production of urticaria.

Experimental physiologists have timidly pushed localization of autonomic function upward from spinal cord and bulb to mesencephalon until finally they also have burst into

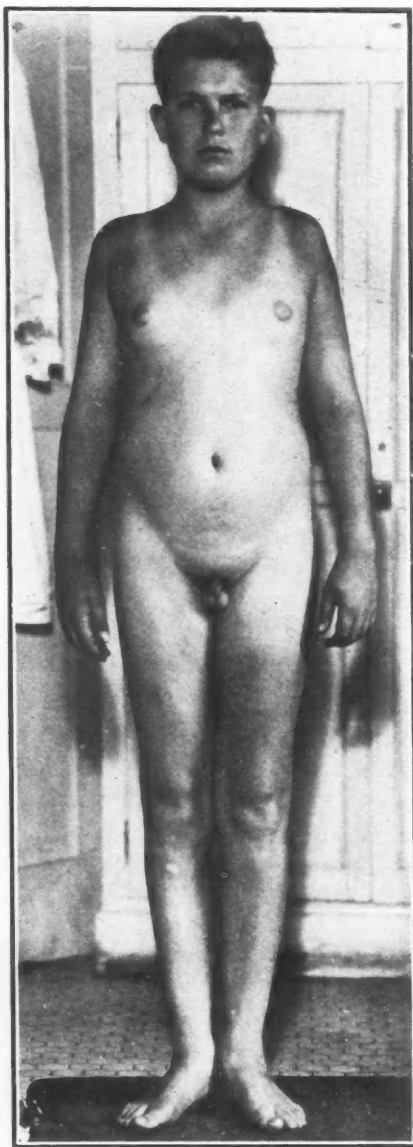


FIG. 5.—A boy of 14 years, nine months after removal of a glioma from the third ventricle. Erythematous patches were present on the chest and legs. Note the tendency to adiposogenital dystrophy, due, no doubt, to invasion of the tuberal region.

the diencephalon with enthusiastic abandon. Some of their results may be described below.

Cardiovascular.—From the posterior portion of the hypothalamus a control is exerted over cardiac acceleration and the secretion of epinephrin through the sympathetic nerves. This was demonstrated in a negative fashion by

Beattie, Brow and Long⁷ by experimental incisions. From stimulation of the tuber nuclei further forward Beattie⁵ secured slowing of the heart, and this effect he was able to abolish by vagus section.

Gastrointestinal.—Experimental lesions in an indefinitely localized region of hypothalamus have been shown to be followed by ulceration and fatal perforation of the wall of the stomach or duodenum (Keller²⁹). Clinically, it is interesting that Rokitsky, years ago, demanded a routine examination of the base of the brain in all autopsies where “softening” or ulceration of the stomach was found. And numerous workers have recognized the neurogenic element in the causation of ulcer. But this has not been localized strictly to the hypothalamus by clinicians.

CASE 4

For example, a student of 22 years was operated upon by my associate, Dr. William Cone, and a medulloblastoma removed from the cerebellum and roof of the fourth ventricle. Six days later he died from hæmorrhage from a duodenal ulcer. There were two smaller ulcers near by. Except that he had vomited twice before operation, there was nothing in the history to suggest that an ulcer was present before operation. Following operation, which was quite uneventful, he vomited blood at intervals until death and necropsy showed the ulcers to be recent.

Cushing has reported 3 cases of perforation of œsophagus, stomach or duodenum in patients suffering from cerebellar tumour, and Blackfan⁸ œsophageal perforation associated with a case of occlusion of the aqueduct of Sylvius and in 3 cases of meningitis. Beattie⁶ stimulated electrically the region of the infundibulum, producing in the exposed stomach increased peristalsis, increased secretion, and, after half an hour of continued stimulation, small hyperæmic patches upon the mucous membrane of the lesser curvature. But all this work must be interpreted carefully, as gastrointestinal ulceration has been reported to follow stimulation of the vagus and various parts of the brain. Furthermore, hyperperistalsis has been known to follow stimulation of certain areas of the cerebral cortex ever since the work of Boche-fontaine in 1876. And Watts and Fulton* inform me that intussusception follows excision of the pre-motor cortex in the monkey, concluding that this region exerts an inhibitory influence upon peristalsis. The removal of this area seems to permit focal ring-like intestinal con-

* Personal communication.

tractions to form which tend to produce intussusception. Whether the centre that is released may be the diencephalic parasympathetic centres of Cushing and of Beattie is open to conjecture. Finally, Cushing has observed in man that intraventricular injection of pituitrin or of pilocarpine, both of which he assumes act upon the paraventricular parasympathetic centres selectively, produced an effect upon the stomach characterized by hypertonicity, hypermotility, and hyperchlorhydria, in addition to diaphoresis and fall in body temperature.

Temperature control.—It is a fact familiar to all physiologists that the decerebrate animal whose brain has been removed down to the anterior end of the midbrain has lost ability to control its temperature, and if its life is to be preserved Bazett and I¹ found that elaborate thermostatic regulation was necessary. As the result of a bout of running movements, or for some other reason, the temperature may rise uncontrollably and the animal be destroyed as though, in a way, it had been the subject of spontaneous internal combustion. Unilateral decerebration at the usual Sherringtonian level mentioned above does not destroy the control mechanism, as I have kept such a cat for over six months, and it controlled its temperature quite well, even through the vicissitudes of an English winter. Further, if in addition to the midbrain the major portion of the diencephalon be left intact, as in Goltz's dog, temperature control is preserved. Within the hypothalamic area are situated the circuits which discharge this most important function automatically, and every neurosurgeon knows to his sorrow that to disturb a tumour in this region may arouse that *bête noir* of hyperthermia which results in death within a day or two. Such a death is preceded by steadily rising temperature with peripheral vasoconstriction, rising pulse, and rising respiratory rate—a syndrome called "hyperthermia" for want of a better name. It seems to be an acute disorder of the mechanisms which ordinarily preserve an even temperature.

Sleep "that knits up the ravelled sleeve of care" has hidden itself away from scientific exploration. Hess²¹ has recently tried to surprise it within the diencephalon. He points out that in profound sleep the deep reflexes are absent, carbon dioxide is increased in the blood stream to a level which would stimulate the respiratory centre of a waking individual, food

assimilation is increased, the heart rate slowed, and the body temperature reduced. In other words, he urges, there exists during sleep a parasympathetic dominance. Further evidence of this dominance is the fact that in sleep the pupil becomes contracted. This contraction gives way to dilatation, paradoxically enough, when the sleeper is awakened, even though it be done by shining a light into his eyes. Zondek and Bier²² claim that a sleep-producing bromine compound (bromhormone) is formed by the pituitary gland, which empties itself of this beneficent substance during sleep. The result of this emptying is said to be that an increased amount of the material may be detected in the medulla oblongata at that time.

In an attempt to prove his theory of parasympathetic dominance in sleep Hess selected a drug, ergotamine (Sandoz), which inhibits the sympathetic system peripherally and activates the parasympathetic. This he injected into the third ventricle. The result was apparent sleep with pupillary contraction. This contraction gave way to dilatation under the influence of light as in the case of true sleep. He then went one step further. Placing a very small enamelled steel bipolar electrode in the brain, and allowing the animal to recover from the operation, he found by using a pulsating direct current that he could put the animal to sleep. But this effect could be produced not from a small "sleep centre" but from a series of areas distributed through the extra-pyramidal motor system. Sleep, he concludes, is at all events a positive phenomenon arising deep within the brain.

CASE 5

From a clinical point of view much work has accumulated upon narcolepsy. I will ignore this literature, but refer to a patient* who for eighteen months before his death suffered from an "unconquerable tendency to fall asleep." He was the chauffeur of one of my associates in Montreal! There was little else in the history, and we saw the poor fellow repeatedly. He would fall asleep during a conversation. Fig. 6 shows the site of his tumour.

Lesions of this sort do not give rise to chronic irritation, and, unless there are epileptic seizures, the effect of such a tumour can only be paralytic. In this case one may assume that the tumour in the anterior portion of the thalamus has released the sleep mechanism below it from a normally inhibitory control.

* This case will be reported in detail by my associate, Dr. William Cone.

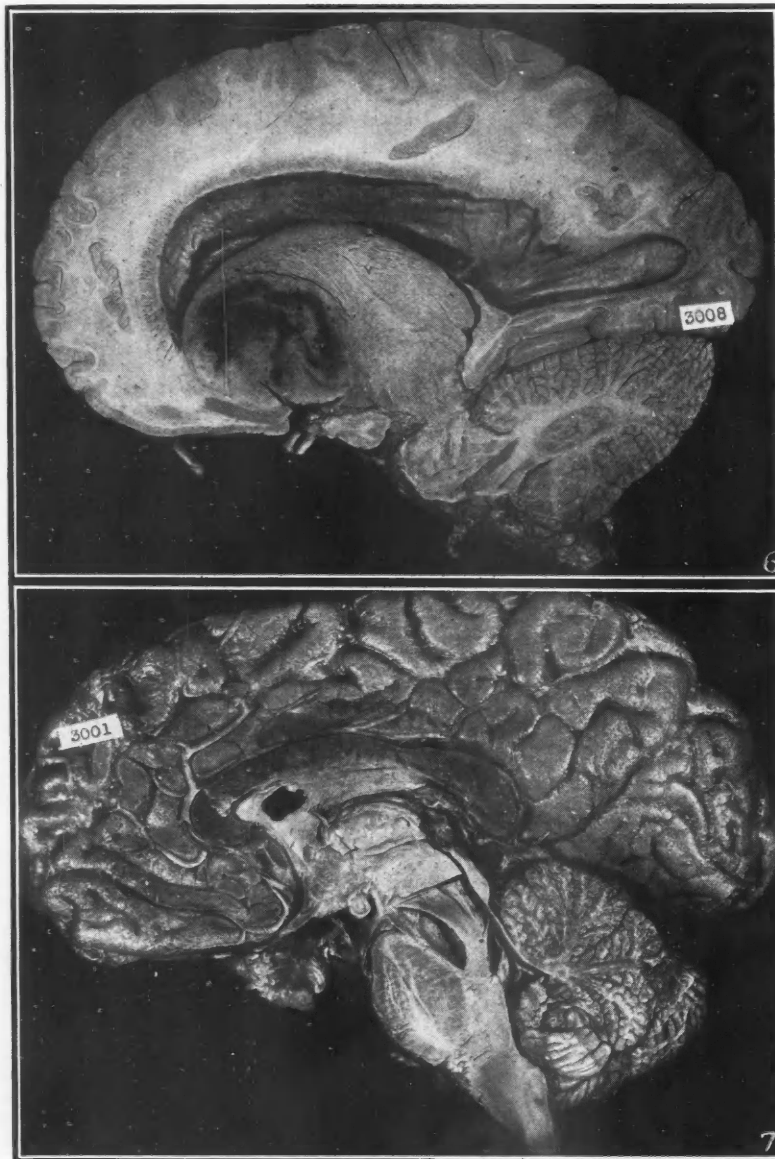


FIG. 6.—A tumour in the anterior portion of the thalamus producing "unconquerable sleep." Note the circumscribed character.

FIG. 7.—A case of diabetes mellitus with a cyst in the mid-brain. (Kindness of the Medical Department, Royal Victoria Hospital, Montreal.)

Water balance.—The condition known as diabetes insipidus is characterized by polydipsia and polyuria. This condition may be produced by lesions of the tuber cinereum when the hypophysis is left intact, as shown by Bailey and Bremer,³ (also Camus and Roussy¹⁰). Clinically, it is encountered most often as the result of a suprasellar tumour. The condition can be controlled almost at once by injections of posterior lobe extract, which is a further evidence of the interaction of the pituitary and the paraventricular nuclei.

It was first suggested by Herring (1908), on histological grounds, that secretion from the pars intermedia and from the posterior lobe

might reach the ventricle by passage through the infundibulum, and Lucien suggested (1909) that the basophilic cells which are found in the posterior lobe and infundibulum all the way to the ventricle were actually cells which had migrated upward from the "adenohypophysis."

Numerous workers have found in the fluid from the cisterna magna (but not in the lumbar fluid) an oxytocic substance which increases the contraction of an excised uterus as pituitrin would do (Karplus and Peczenik²⁸). Further, a substance is found in the fluid which causes melanophore cells in the frog's skin to expand so that the skin becomes darker. Karplus and Peczenik found that direct stimulation of the hypothalamus served to increase this oxytocic substance, which they believed to be pituitrin. This increase takes place even after sympathetic nerves are cut.* The suggestion comes to mind, of course, that a lesion situated in the tuber, because of its position, forms a block to the upward passage of a pituitrin-like substance. But we are in the end left with no certain knowledge, except that diabetes insipidus is produced not by an intrasellar lesion but by a suprasellar one, while the specific therapeutic agent, *i.e.*, pituitrin or one of its derivatives, can be made not from tuberal tissue but from the posterior lobe of the hypophysis.

Carbohydrate metabolism.—In 1858 Claude Bernard was seeking to find in the vagus nucleus a nervous mechanism that had to do with glycogen formation when he first punctured the floor of the fourth ventricle. He was surprised to find that it produced transient glycosuria. This puncture of Claude Bernard was the earliest proof that diabetes might be dependent upon a disorder of the central nervous system. It has

* It must be added that van Dyke and Bailey believe the oxytocic substance to be in fact only an increase of calcium within the fluid. They found this increase both in lumbar and cistern fluid, however.

since been shown by Asehner that puncture higher up in the hypothalamus would also produce glycosuria. It is, further, common knowledge that a severe emotional upset can give rise to transient glycosuria and that anæsthesia may have the same result.

Tumours of the nervous system, if situated near the third ventricle, may be associated with diabetes mellitus, as in the carefully studied case of Byrom and Russell.⁹ Van Bogaert reported 2 cases of tumour involving the infundibulum in which there was hyperglycæmia without glycosuria.

I may also mention a most interesting case* of diabetes mellitus of five years' standing in which Dr. E. H. Mason found that insulin had little effect in curbing the glycosuria. Autopsy showed in addition to degeneration of the pancreas the cyst of the midbrain shown in Fig. 7. A lesion in the vicinity of the descending autonomic pathways was actually suspected before death. But even more significant of a higher control is the oft-reported association of diabetes mellitus with acromegaly (25 per cent of cases, according to Davidoff and Cushing). The diabetes which is thus produced is not progressive and may disappear. The acidophilic adenoma of acromegaly seems to produce a sort of hyperpituitarism. The diabetes mellitus which may result might well be the result of the presence of an excess of some pituitary product.

On the other hand tumours of other types which compress the pituitary and adjacent ganglia tend to produce hypopituitarism, and may be associated only with increased sugar tolerance. Such a patient can, of course, ingest over 100 grams of glucose without the glycosuria which would appear in the normal subject. The explanation offered is that the pituitary and its associated hypothalamic nuclei exert normally an inhibitory influence upon the islets of Langerhans or upon insulin itself, so that a defect in this inhibitory action renders more insulin available, and therefore gives to the patient an increased glucose tolerance.

In experimental hypophysectomy dogs show a normal blood sugar level, but if they are starved sudden hypoglycæmic crises are apt to occur which may be fatal. Similar severe

hypoglycæmia in clinical hypopituitarism has been reported by Wilder.³³ Furthermore, hypophysectomized dogs are hypersensitive to insulin (Houssay and Magenta,²²), which might be expected if the removal of hypophysis had also removed an inhibitory influence upon insulin. Additional evidence which points in the same direction is the recent demonstration from the Argentine School (this time Houssay and Biasotti,²⁴) that hypophysectomy decreases the severity of diabetes so that dogs after complete pancreatectomy may survive six months, whereas controls with normal hypophyses died in one to four weeks with severe diabetes. Thus hypophysectomy may yet be proposed to some unsuspecting neurosurgeon as a cure for diabetes mellitus.

In toads pancreatectomy produces very severe diabetes. If the pituitary body, or even only the anterior glandular portion, be removed pancreatectomy has little effect. But if now anterior lobe be implanted beneath the skin, next day an intense diabetes with glycosuria and hyperglycæmia occurs, and, finally, Houssay²³ has produced the same effect by injection of anterior lobe extract. Barnes² has verified this work, and obtained the diabetogenic effect with both the growth and the thyreotropic fractions derived from anterior lobe.

The inhibitory action of anterior lobe upon insulin seems established, but it has not been shown yet whether it acts through the general blood stream, or whether its effect is directly exerted upon the diencephalon, which may in turn exert the inhibitory action upon the pancreas through the vagus. There is in fact evidence which favours the vagus as the final common diabetogenic pathway. Finally, it may be suggested that possibly the control of the liberation of the diabetogenic principle from the pituitary gland may be found to lie in the diencephalon itself. In this diabetogenic activity may lie an explanation of some of the discrepancies that exist between the clinical findings of diabetes mellitus and the pathological state of the pancreas at autopsy.

Certain principles are emerging from the obscurity that has cloaked the diencephalon and hypophysis, and the internist may now perceive the nervous mechanisms which unsuspected have always co-ordinated the vital processes and preserved the "internal environment".

* To be published fully by Dr. E. H. Mason.

REFERENCES

1. BABINSKI, J., Tumeur du corps pituitaire sans acromégalie et avec arrêt de développement des organes génitaux, *Rev. Neurol.*, 1900, 9: 531.
2. BARNES (quoted by Collip, 1933).
3. BAILEY, P. AND BREMER, F., Experimental diabetes insipidus, *Arch. Int. Med.*, 1921, 28: 773.
4. BAZETT, H. AND PENFIELD, W., A study of the Sherrington decerebrate animal in the chronic as well as the acute condition, *Brain*, 1922, 45: 185.
5. BEATTIE, J., Hypothalamic mechanisms, *Canad. M. Ass. J.*, 1932, 26: 400.
6. BEATTIE, J., The relation of the tuber cinereum to gastric and cardiac functions, *Canad. M. Ass. J.*, 1932, 26: 278.
7. BEATTIE, J., BROW, G. AND LONG, C., Physiological and anatomical evidence for the existence of nerve tracts connecting the hypothalamus with spinal sympathetic centres, *Proc. Roy. Soc. B.*, 1930, 106: 253.
8. BLACKFAN, K., personal communication to Cushing, 1932.
9. BYROM, F. AND RUSSELL, D., Ependymal cyst of the third ventricle associated with diabetes mellitus, *The Lancet*, 1932, 2: 278.
10. CAMUS, J. AND ROUSSY, G., Les syndromes hypophysaires, *Rev. Neurol.*, 1922, 6: 22.
11. COLLIP, R., 1928, (quoted by Cushing¹⁶).
12. COLLIP, J., Chemistry and physiology of anterior pituitary hormone. To appear in *Proc. Congr. Phys. & Surg.*, Washington, 1933.
13. COLLIP, J. AND SELYE, H. AND THOMSON, D., Preparation of a purified and highly potent extract of growth hormone of anterior pituitary lobe, *Proc. Soc. Exper. Biol. & Med.*, 1933, 30: 544.
14. CUSHING, H., The basophil adenomas of the pituitary body and their clinical manifestations, *Bull. Johns Hopkins Hosp.*, 1932, 50: 137.
15. CUSHING, H., Pituitary body, hypothalamus and parasympathetic nervous system, Thomas, Baltimore, 1932, p. 84.
16. CUSHING, H., Dyspituitarism; twenty years later, *Arch. Int. Med.*, 1933, 51: 487.
17. ESPINASSE, P., The development of the hypophysis-portal system in man, *J. Anat.*, 1933, 68: 11.
18. EVANS, H., Present position of our knowledge of anterior pituitary function, *J. Am. M. Ass.*, 1933, 101: 425.
19. FRÖHLICH, A., Ein Fall von Tumor der Hypophysis cerebri ohne Akromegalie, *Wien. klin. Rundschau*, 1901, 15: 883.
20. GREVING, R., Die zentralen Anteile des vegetativen Nervensystems. *Handb. d. mik. Anat. d. Mensch.*, 1928, 4: 917.
21. HESS, W., The autonomic nervous system, *The Lancet*, 1932, 2: 1199.
22. HOUSSAY, B. AND MAGENTA, M., *Compt. rend. Soc. de Biol.*, 1929, 102: 429.
23. HOUSSAY, B., 1932, (quoted by Collip, 1933).
24. HOUSSAY, B. AND BLASOTTI, A., The hypophysis, carbohydrate metabolism and diabetes, *Endocrinology*, 1931, 15: 511.
25. HUBER, G. AND CROSBY, E., Somatic and visceral connections of the diencephalon in the vegetative nervous system, *Publ. Assn. Res. Nerv. & Ment. Dis.*, 1928, 9: 199.
26. JACKSON, H., Selected writings of John Hughlings Jackson. Ed. Taylor. Hodder and Stoughton, London, 1931, vol. 1.
27. JOSEPHY, H., Normale und pathologische Anatomie der vegetativen Zentren des Zwischenhirns, des Sympathikus und Parasympathikus. *Handb. der Inneren Sekretion*, Kabitzsch, Leipzig, 1932, p. 662.
28. KARPLUS, I. AND PECZENIK, O., Ueber die Beeinflussung der Hypophysentätigkeit durch die Erregung des Hypothalamus, *Pflüger's Archiv. f. Physiol.*, 1930, 225: 654.
29. KELLER, A., Ulceration in the digestive tract following experimental lesions in the hypothalamus. Communicated to the Federation of American Societies for Experimental Biology, Phila., Apr. 30, 1932.
30. PENFIELD, W., Diencephalic autonomic epilepsy, *Arch. Neur. & Psych.*, 1929, 22: 358.
31. POPA, G. AND FIELDING, U., The vascular link between the pituitary and hypothalamus, *The Lancet*, 1932, 2: 238.
32. PUTNAM, T., BENEDICT, E. AND TEEL, H., Studies in acromegaly, *Arch. Surg.*, 1929, 18: 1708.
33. WILDER, H., Ein neues hypophysäres Krankheitsbild, *Deutsche Zeitschr. f. Nervenheilk.*, 1930, 112: 192.
34. ZONDEK, U. AND BIER, A., Brom im Blut bei manisch-depressiven Irresein, *Klin. Wchnschr.*, 1932, 11: 633, 759.

APONEUROTIC SUTURE REPAIR OF FEMORAL HERNIA*

BY WALTER G. CARSCADDEN, M.B., B.Sc. (MED.),

Toronto

THE controversy between Sir Arthur Keith and Hamilton Russell regarding the origin of the femoral hernia sac has resulted in two opposing principles in operative treatment. If Russell is correct in his belief that the femoral hernia sac is developmental in origin, then, theoretically, all that should be necessary to cure the condition would be the obliteration of the sac. He himself simply twists the sac and ligates it. On the other hand, Keith maintains that the hernial sac is acquired as a result of repeated increased intra-abdominal tension. Every time an individual strains or coughs a water-hammer-like wave of increased intra-abdominal pressure is transmitted by the external iliac vein and the semifluid pro-peritoneal fat to the femoral ring. This results in a widening of the ring and therefore a weakened area, and finally a sac is formed. If this latter theory is correct it would appear logical to make some attempt at repairing the weakened area as well as removing the sac.

The answer should be found in the end-results of the two methods of treatment, but there is a surprising dearth of follow-up results in the literature. The reported recurrence rate of all types of repair varies from 4.5 per cent (Watson) to 30 per cent (Noble). Pott found that when the sac only was removed there were 36.7 per cent of recurrences; on the other hand when the ring was closed the recurrences numbered 23.6. Similarly, Bresset found 29 per cent of recurrences when the sac only was excised, while with closure of the ring the number was 8.6. Gask tested this point by removing femoral hernia sacs through a laparotomy wound in 10 cases and had 6 recurrences.

The increasing popularity of the inguinal approach for the repair of femoral hernia is further proof that most surgeons believe that it is necessary to make some closure of the ring. This approach was first carried out by Annandale² in 1876. Later, the method was further elaborated by Ruggi¹³ (1893), Lotheissen⁷ (1898), Gordon⁵ (1900) and by Moschcowitz¹⁰

* From the Department of Surgery of the University of Toronto, St. Michael's Hospital.

(1907). The last did most to popularize this approach on this continent.

Lotheissen sutured the conjoined tendon to Cooper's ligament as far lateral as the external iliac vein. This is a logical anatomical repair, because the conjoined tendon is normally attached to the iliopectineal line for a variable distance. Ruggi and Moscheowitz sutured Poupart's ligament to Cooper's ligament and this also has anatomical justification because these two ligaments are joined together by Gimbernat's ligament.

There are four main advantages in the inguinal operation: (1) it is possible to tie the sac high enough to prevent any dimple; (2) damaged intestine may be dealt with more easily; (3) aberrant obturator vessels may be ligated before they are injured in freeing a strangulated hernia; (4) it is possible to make a more anatomically correct repair of the

oblique has been used by Battle,⁴ Andrews¹ and Keynes.⁶

Gallie and LeMesurier showed that their method of weaving a fascial suture was superior to fascial sheet grafts, because of the tendency of the latter to give at the edges. A living suture removed from the fascia lata has been used by Gallie in the repair of a large femoral hernia, but obviously one would hesitate to unduly prolong the operation on a strangulated hernia.

McArthur⁸ (1901) began using a strip of fascia from the aponeurosis of the external oblique muscle in the repair of inguinal herniæ, and the use of such a strip has become more popular for those cases where it is not necessary to use a suture of fascia lata. The McArthur aponeurotic strip lends itself singularly well also to the repair of a femoral hernia, and it is only due to the almost complete absence of de-

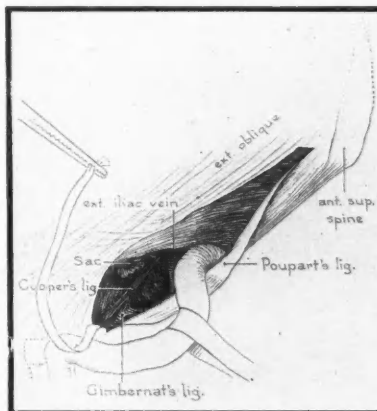


FIG. 1. — Semidiagrammatic drawing illustrating the relationship of the ligated sac to Cooper's ligament, the femoral ring and the external iliac vein.

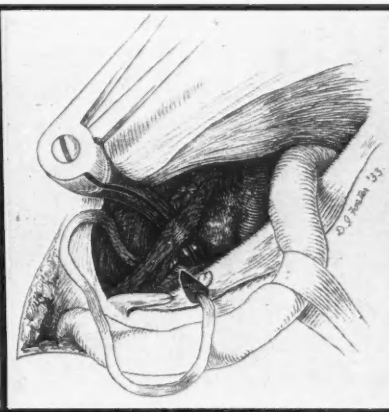


FIG. 2.—Insertion of the first two sutures. In this case Gimbernat's ligament was cut, therefore the first suture closes this gap. The external iliac vein is seldom seen as plainly as in the drawing, as it is unnecessary to remove its covering of fatty areolar tissue.

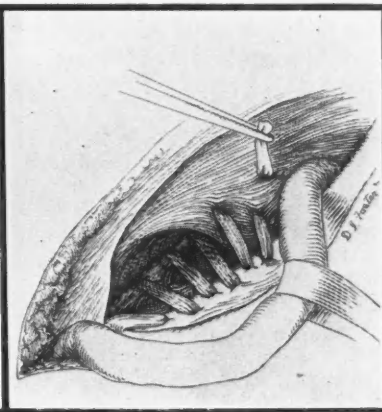


FIG. 3.—Here is the fourth loop that has passed from Cooper's ligament to the conjoined tendon. The suture has not been pulled taut as yet, therefore seems shorter than it actually is.

femoral ring. However, the femoral ring is not easy to obliterate, because it has semi-rigid walls on three sides; Poupart's ligament anteriorly, Gimbernat's ligament medially, and Cooper's ligament posteriorly (Fig. 1).

Both the Lotheissen and Moscheowitz methods entail considerable tension on the sutures, and so numerous methods have been devised to overcome this. Roux attached Poupart's ligament to the pubic bone with metal staples. Hey Groves cuts Poupart's ligament and sutures the cut end to Cooper's ligament. A trap-door-like flap of fascia from the aponeurosis of the external

oblique has been used by Battle,⁴ Andrews¹ and Keynes.⁶ Gallie and LeMesurier showed that their method of weaving a fascial suture was superior to fascial sheet grafts, because of the tendency of the latter to give at the edges. A living suture removed from the fascia lata has been used by Gallie in the repair of a large femoral hernia, but obviously one would hesitate to unduly prolong the operation on a strangulated hernia.

TECHNIQUE

An incision is made to converge on Poupart's ligament at the subcutaneous inguinal ring and the inguinal canal is opened. The cord is freed and retracted downward. The transversalis fascia is now carefully incised parallel to and

just above the recurved margin of Poupart's ligament. This brings into view the properitoneal fat which can be separated from the neck of the sac by blunt dissection in a vertical direction. Pubic branches of the inferior epigastric artery and vein will be encountered, crossing over or under the sac, and should be ligated. The external iliac vein can be protected by the index finger. Traction is next made on the neck of the sac and adhesions to Poupart's ligament are bluntly separated. If necessary, a nick may be made in Gimbernat's ligament. Usually it is possible to deliver the sac intact above Poupart's ligament, but if there are adhesions about the fundus the lower part of the incision can be retracted downwards and these adhesions freed. Frequently the sac is thickened where it comes in contact with the femoral ring, and this thickened portion may contribute to a strangulation, as Souttar suggests.

The sac is opened now and the contents dealt with. Then the sac should be ligated as high as possible and it will drop up out of sight behind the conjoined tendon (Fig. 1). At this stage the boundaries of the femoral ring are fully visible. Cooper's ligament is identified as a white bundle of fibres on the iliopectineal line and is continuous with Gimbernat's ligament. It lies on a deeper and higher plane than Poupart's ligament and diverges from it. To bring the two ligaments in contact requires considerable tension on the sutures and tends to pinch the external iliac vein. If it were possible to advance Gimbernat's ligament laterally to fill the femoral ring it would overcome this difficulty. This can be done with a living aponeurotic suture.

A strip of fascia about one-quarter inch wide is detached from the medial leaf of the external oblique aponeurosis, taking care to leave the medial end of the strip attached to the pubes. This can best be done by following McArthur's suggestion of cutting the strip from within outward. I have found it an advantage to leave a small tuft of muscle on the very end of the strip. This strip may be tied to a piece of silk or catgut, and this in turn passed through the eye of a stout fully curved needle in the way McArthur described. A small Gallie needle will make a hole large enough to pull the strip through. However, I prefer a special instrument which I use to pull the fascial strip through from side to side (See

Canad. M. Ass. J., 1931, **25**: 468). The clamp needle is passed through Cooper's ligament and up through the recurved part of Poupart's ligament at, or medial to, the crescentic border of Gimbernat's ligament (Fig. 2). The jaws are opened and an assistant feeds the end of the aponeurotic strip into them. The assistant will find that it is preferable to hold the end of the fascial strip with a hæmostat and the middle portion with smooth dressing forceps.

In this way about three loops of this continuous fascial strip are woven across the femoral ring. These are tightened, but not sufficiently to approximate Poupart's to Cooper's ligament. The points where the strip passes through Poupart's ligament are locked with interrupted sutures of No. 0 chromic or fine silk. These sutures prevent the fascial strip slipping. If one wishes, the strip may be brought up through itself, as Gallie and LeMesurier do in locking a living suture, but in order to obtain the maximum length of the strip I seldom do this.

After the last loop has been pulled through Cooper's ligament the strip is brought up through the conjoined tendon and then carried further laterally as a continuous suture, bringing the fibres of the internal oblique and transversalis muscles to Poupart's ligament. By bringing the suture from Cooper's ligament through the conjoined tendon to Poupart's ligament this part of the conjoined tendon is tucked down around the medial side of the external iliac vein and so helps to fill in the gap above the femoral ring. It is thus possible to combine the features of the Lotheissen and Moschcowitz repair (Fig. 3). Usually the aponeurotic strip will be long enough to attach the internal oblique transversalis muscles to Poupart's ligament as far as the abdominal inguinal ring. The strip is then brought out through the external oblique, and, if long enough, is woven back and forth once or twice across the split external oblique aponeurosis, going medially towards the subcutaneous inguinal ring. This reconstructs the intercrural fibres. The end of the strip is locked to the external oblique with No. 0 chromic catgut or silk. The aponeurosis of the external oblique is then closed with a continuous suture of No. 1 chromic catgut. It is advisable to start this suture laterally to the outer end of the incision in the aponeurosis, because frequently a small vessel is wounded when

the outer end of the strip is cut away, and this may cause an annoying hæmatoma.

The operation requires about the same time as a Moschcowitz repair with catgut, and it is preferable to use subarachnoid block anæsthesia with neocain or nupercaine. I keep these patients in bed at least fourteen days.

During the past three years I have performed this operation six times and so far have had no recurrence. It has also been used with satisfaction by several of my colleagues.

BIBLIOGRAPHY

1. ANDREWS, E., Closure of large femoral hernia, *Surg., Gyn. & Obst.*, 1924, 39: 754.
2. ANNANDALE, T., Radical cure of femoral hernia, *Brit. M. J.*, 1877, 1: 815.
3. AUCHINCLOSS, H., Fascial strip repair of femoral hernia, *Ann. Surg.*, 1925, 81: 1009.
4. BATTLE, W. H., The radical cure of femoral hernia, *Edin. M. J.*, 1908, 23: 489.
5. GORDON, T. E., The radical cure of femoral hernia, *Brit. M. J.*, 1900, 1: 1338.
6. KEYNES, G., The modern treatment of hernia, *Brit. M. J.*, 1927, 1: 173.
7. LÖTHEISEN, G., Zur Radicaloperation der Schenkelhernien, *Centralbl. f. Chir.*, 1898, 25: 549.
8. MCARTHUR, L., Autoplastic sutures in hernia and other diastasis, *J. Am. M. Ass.*, 1904, 43: 1039.
9. MIKULI, Discussion on the radical operations for inguinal and femoral hernia and their end results, *Int. Abt. Surg.*, 1929, 48: 322.
10. MOSCHCOWITZ, A. V., Femoral hernia: a new operation for the radical cure, *N. Y. State J. Med.*, 1907, 7: 396.
11. PATTERSON, J. E., The use of fascial sutures in the operative treatment of hernia, *Glasgow M. J.*, 1928, 109: 438.
12. ROUX, Nouveau procédé de cure radicale de la hernie crurale, Anjou. M. (Angers), 1899, 6: 21.
13. RUGGI, G., Del metodo inguinale nella cura radicale dell' hernia crurale, Bologna, N. Zanichelli, 1893.
14. A more complete bibliography is given by TASCHE, L. W., The etiology of femoral hernia, *Arch. Surg.*, 1932, 45: 748.

STAPHYLOCOCCUS ANTITOXIC SERUM IN THE TREATMENT OF ACUTE STAPHYLOCOCCAL INFECTIONS AND TOXÆMIAS*

By C. E. DOLMAN, M.B., B.S., M.R.C.P., D.P.H. (LOND.),

Research Assistant and Clinical Associate, Connaught Laboratories, University of Toronto,
Toronto

I

THIS paper records the results obtained from using antitoxic horse serum in the treatment of certain well-known types of acute staphylococcal infection of human skin, bone, meninges and blood. Although antitoxic serum therapy in these diseases has proved distinctly encouraging, definite limitations to its efficacy have been observed. In the course of this report an attempt will be made to indicate how some of these limitations may come to be circumvented.

By injecting horses with staphylococcus filtrates, Parker and Banzhaf¹ produced a serum which in high dilutions neutralized the skin necrosing properties of the filtrates. No records can be traced of observations which may have been made upon the clinical value of their serum. Subsequent to the Bundaberg disaster in 1928, and the resulting revival of interest initiated by Burnet² in the toxigenic properties of staphylococci, various workers, including Burnet,³ have reported the preparation of staphylococcal antitoxic serum from horses immunized with the exotoxin. For instance, Gross⁴ states that the use of antitoxic serum is of prime importance in staphylococcal septicæmia, as well as in severe

cases of osteomyelitis, furuncles and carbuncles of the face and neck where symptoms of toxæmia are marked. No clinical details are given to substantiate this statement. Pantón, Valentine, and Dix⁵ give an account of 13 cases of acute staphylococcal infection treated with antitoxic serum prepared by the Lister Institute. In 5 cases of carbuncle, the effect of their serum was on the whole indefinite, while the fatal course of 3 cases of fulminating septicæmia was not apparently influenced by the serum. But in 5 pyæmic cases, 3 having a demonstrably positive blood culture, a general change for the better and cessation of further metastatic abscess development followed administration of the serum. Parish and Clark⁶ allude briefly to the clinical usefulness of antitoxic serum prepared by them at the Wellcome Research Laboratories, and state that encouraging results were obtained in a few cases, alleviation of symptoms and sometimes rapid recovery following its use.

Staphylococcus antitoxic serum prepared by the Connaught Laboratories has been available for clinical trial in Canada for over two years, under conditions which have enabled a fairly critical appraisal of its therapeutic value to be reached. Before considering the 104 cases in which the serum was used, a brief account will

* Received for publication March 31, 1934.

be given of the various stages in its preparation, and of certain properties which may have contributed towards its efficacy in several of those cases.

PREPARATION OF STAPHYLOCOCCUS ANTITOXIN

Bacteria-free staphylococcus exotoxin was prepared by a modified Burnet method which has been fully described elsewhere.⁷ A strain of *Staphylococcus aureus hæmolyticus* (No. 24) which has consistently yielded highly potent toxin for over two years was the one chiefly used for toxin production, although strains recently isolated from the blood stream and other severe staphylococcal infections were also used as supplementary sources of toxin. An innocuous antigen was obtained from the pooled samples of toxin by incubating them for one to three weeks with sufficient solution of formaldehyde to give from 0.1 to 0.15 per cent by weight of HCHO. This formolized toxin (staphylococcus toxoid), has proved a useful antigen for the early stages of immunization of several horses. The initial dose of 5 c.c. was gradually increased to 250 c.c., doses being given subcutaneously at weekly intervals. Crude toxin was then used instead of the toxoid, starting with 25 c.c. of low-potency toxin, and mounting by small increments to 300 c.c. or more of high-potency toxin, the doses still being given subcutaneously about once a week. Preliminary immunization with staphylococcus toxoid appears markedly to reduce the high fatality rate recorded by Parker and Banzhaf,¹ who lost five out of seven horses after six weeks to three months of treatment with subcutaneous injections of toxin. Following this method of immunization, the horses attained a high titre of antitoxin relatively soon. Antigenic stimuli of increasing magnitude had then to be given in order to maintain this titre.

A fairly close parallelism obtains between the hæmolytic and the dermo-necrotic and lethal properties of staphylococcus filtrates prepared by the method we have utilized. Similarly, sera with high anti-hæmolytic titres have shown a proportionately high neutralizing power against the dermo-necrotic and lethal properties of staphylococcus toxin. Determination of their hæmolytic and anti-hæmolytic titres has therefore been adopted as a simple means of assay of the toxin and antitoxin respectively. The antitoxic properties being embodied in the so-

called pseudo-globulin fraction, the serum was submitted to a fractional concentration process. The concentrates were then diluted with a sufficient volume of physiological saline to bring their total solid content and their turbidity well within the limits generally accepted as permissible for therapeutic sera; 0.2 per cent of tricresol was added, and the final product filtered through a Berkefeld candle and distributed in 30 c.c. quantities.*

THE PROPERTIES OF STAPHYLOCOCCUS ANTITOXIN

Staphylococcus antitoxic serum prepared in the way described possesses to a marked degree the power to neutralize the pathogenic effects of staphylococcus toxin on the cells and tissues of laboratory animals. Incidentally, it shows also a high agglutinating titre against staphylococcal suspensions. The anti-hæmolytic power of the serum is probably of secondary importance from the clinical standpoint. But the neutralizing properties of the serum against the dermo-necrotic and lethal effects of the toxin can be readily demonstrated on laboratory animals and are likely to be of considerable therapeutic significance. Other workers have shown that staphylococcus antitoxic serum is able to neutralize *in vitro* the leucocidin and the plasma-coagulating substance present in certain samples of staphylococcus toxin. These properties of the serum may also contribute largely to its clinical value. Our contentions should perhaps be briefly elaborated at this point.

Extensive inflammatory necrosis soon develops around the site of injection into any common laboratory animal of a small volume of bacteria-free toxin, while no apparent reaction follows injection of the same volume of toxin to which a neutralizing dose of antitoxic serum has been added. The proteolytic action of disintegrating leucocytes may subsequently contribute to the inflammatory necrosis so characteristic of staphylococcal infection of the skin and deep tissues, but it seems probable that the agent primarily responsible for this type of tissue destruction is the necrotoxin produced by the invading staphylococci.

The remarkably rapid death which in a large variety of laboratory animals follows the intravenous injection of staphylococcus toxin may

* I am indebted to Drs. N. McKinnon and D. W. Cameron for supervising the immunization of the horses, and to Mr. W. Knowles for concentrating the serum.

be deemed by those unfamiliar with this product to have little bearing upon the pathology of generalized staphylococcal infection in human beings, but we believe a close relationship does in fact exist. A fatal issue sometimes occurs with devastating rapidity in staphylococcal septicæmia, whether this be secondary to, for example, a carbuncle in an adult, or osteomyelitis in a child. Moreover, death may follow a localized staphylococcal infection, where no blood stream invasion can be detected, from what it is only reasonable to term staphylococcal toxæmia. The report⁸ of the Royal Commission of investigation into the fatalities at Bundaberg, Queensland, where 12 young children died in from 15 to 34 hours* after a subcutaneous injection of diphtheria toxin-antitoxin mixture, which in the absence of added antiseptic had become contaminated with staphylococci, provides the classical example of human deaths from staphylococcal toxæmia. The Commissioners concluded that the symptoms manifested "were those of a profound and overwhelming toxæmia" resulting "from the formation of toxin *in vivo*, with or without septicæmia." The same train of symptoms, increased respiratory and cardiac rate, gastrointestinal disturbances, pupillary dilatation, collapse, coma, convulsions and death, can be reproduced unfailingly, though in more rapid succession, in a wide variety of laboratory animals given an intravenous injection of staphylococcus toxin.

At autopsy, macroscopic hæmorrhages may often be noted on the surface of the lungs, heart, kidneys, and thymus of laboratory animals dead from acute staphylococcal toxæmia, while intense congestion of the abdominal and thoracic viscera is usually evident. Microscopically, a striking degree of generalized capillary dilatation and multiple hæmorrhages are apparent, especially in the kidneys, heart, lungs, liver, spleen, suprarenals, and the central nervous system. Similar lesions may be observed in the corresponding tissues of human beings who have died from generalized staphylococcal infection. The inference seems legitimate that in this disease, death is primarily due to staphylococcus exotoxin. If abscesses form in already overtaxed vital organs, such as the lungs and kidneys, the fatal outcome will, of course, be

accelerated. But multiple abscess formation, though generally regarded as the essential pathological manifestation of generalized staphylococcal infection, is after all a defence mechanism, which in the more fulminating types of infection may have no opportunity to develop.

The overcoming of an infection with what Wright called "serophytic" microorganisms, such as staphylococci, depends chiefly upon their phagocytosis by polymorphonuclear leucocytes. Hence it appears highly desirable to neutralize by means of antitoxic serum the leucocidin which is probably produced in severe staphylococcal infections. Several workers, notably Neisser and Wechsberg,⁹ and, later, Parker and Gunther,¹⁰ have demonstrated the presence of a powerful leucocidin in staphylococcal filtrates, while Panton and Valentine¹¹ have emphasized the importance of the leucocidin-neutralizing property of staphylococcus antitoxic serum. This property of the serum may in fact be said to impart to it an indirectly anti-bacterial function.*

The plasma-coagulating substance liberated by viable staphylococci, and present in staphylococcal filtrates, which has been thoroughly investigated by Gross,¹² may play a conspicuous rôle (possibly in conjunction with the hæmagglutinin to whose presence in such filtrates we have ourselves drawn attention⁷) in the formation of the septic thrombi which are so characteristic a feature of intensive staphylococcal infection. *In vitro* inhibition of the plasma-coagulation by antitoxic serum was readily demonstrated by Gross, but we have not yet succeeded in demonstrating this phenomenon to our own satisfaction.

Under *in vitro* conditions a high proportion of carbon dioxide in the surrounding atmosphere during incubation greatly enhances the toxic powers of staphylococci. Presumably the comparatively high partial pressure of carbon dioxide which obtains under *in vivo* conditions is also conducive to toxin production. Argyll Campbell¹³ has shown that normal human tissues provide a carbon dioxide tension equivalent to at least 6.5 per cent of an atmosphere, while a considerably higher percentage obtains at the

* Twenty-two hours was the average time that elapsed before death.

* No directly bactericidal action of the serum would be anticipated, for other therapeutic sera of established efficacy have no such effect upon their homologous microorganism, and indeed staphylococci readily multiply in staphylococcus antitoxic serum.

site of inflammatory changes. Direct evidence that staphylococcus toxin may be produced *in vivo* in a laboratory animal is supplied by an observation of Burnet,² that the pericardial and pleural fluids of rabbits dead from acute staphylococcal infection induced by intravenous injection of staphylococci contain toxin in sufficient amount to be recognized by its specific dermo-necrotic effect.

To recapitulate, our view is that staphylococci derive their pathogenicity largely from the toxins which they may produce *in vivo*, as they are known to do *in vitro*. A hæmolysin, a leucocidin, a necrotoxin, a plasma-coagulating substance, and a substance causing rapid death when injected intravenously into laboratory animals may all be detected in filtrates of staphylococci grown under the appropriate environmental conditions. Without touching upon the controversy as to whether these various properties of staphylococcal filtrates are functions of a single exotoxin or of separate toxic substances, an argument has been outlined imputing to these properties a rôle of considerable importance in the pathology of acute staphylococcal infection. The clinical results obtained from the use of antitoxic serum offer further evidence in support of this argument.

CLASSIFICATION OF PATIENTS AND THE RESULTS OBTAINED

The 104 patients who figure in this investigation were, with only two exceptions, treated in hospital, 69 in Toronto, 20 in Montreal, 4 in Brantford, 2 in Vancouver, and 1 each in Seattle (Wash.), London (Ont.), Tillsonburg, and Niagara Falls. These figures include every case known to have received the serum. In Table I the cases are classified, and the numbers which died or recovered in each group are given. No attempt is made in the Table to indicate the original prognosis of the particular cases treated, although of course the clinical diagnoses carry their own general prognostic significance. Nor is the fact indicated that a few patients who appeared to have overcome their staphylococcal infection eventually succumbed to a secondarily infecting microorganism such as streptococcus. In reviewing the results, it should be borne in mind that the serum could not reasonably have been expected to avert a fatal issue in a large number of instances, by reason of the site and number of the lesions already present, the long

lapse of time since the onset of the disease, or the obviously moribund condition of the patients. The inclusion of these hopeless cases may at least serve to re-emphasize the general principle which holds in serum therapy, and which particularly applies to severe staphylococcal infections, namely, that every delay before the administration of antitoxin increasingly jeopardizes its chances of proving beneficial.

TABLE I.
CLASSIFICATION AND END-RESULTS OF CASES TREATED
WITH ANTITOXIC SERUM

Clinical Classification	Total No. Treated	Number Died	Number Recovered
Acute carbuncle, carbunculosis and generalized furunculosis..	14	0	14
Acute generalized bullous dermatitis	3	0	3
Other infections of skin and subcutaneous tissues by staphylococcus	7	0	7
Acute septic arthritis.....	1	1	0
Empyema	3	1	2
Meningitis and/or brain abscess.	6	2	4
Osteomyelitis without demonstrated staphylococæmia	3	0	3
Pyæmia without demonstrated staphylococæmia	3	0	3
Staphylococæmia and meningitis	2	2	0
Staphylococæmia in children secondary to osteomyelitis....	32	10	22
Staphylococæmia in children not secondary to osteomyelitis.	8	6	2
Staphylococæmia in adults and adolescents	22	17	5
	104	39	65

The staphylococcal origin of every infection in this series was confirmed by bacteriological examination, and in many instances the toxigenic capacity of the strains isolated was verified and assayed in terms of hæmolytic units. Where possible, the staphylococcus antitoxin content of a patient's serum was estimated on several occasions during the course of the illness, in terms of anti-hæmolytic units. Information has thus been gained in regard to the rate of absorption and excretion of staphylococcus antitoxin, the time and extent of development of antitoxic immunity provoked by the infection itself, and the stage at which antitoxin serum therapy may advisedly be supplanted by injections of the active antigen, staphylococcus toxoid. Case histories illustrative of the use of antitoxin in these various types of staphylococcal infection will be reported in a subsequent issue of this *Journal*. In the present paper, limitations of space preclude more than a brief exposition of the general results obtained in each main group of cases.

Acute carbuncle, carbunculosis, and generalized furunculosis.—This group comprised 10 cases of acute carbuncle, 1 of multiple carbunculosis, and 3 of generalized furunculosis. In this series of adults with acute carbuncle, an average of 60 c.c. of staphylococcus antitoxin was well tolerated, and invariably produced very marked general and local improvement within 24 to 48 hours of administration. Several extensive carbuncles, which had shown no signs of commencing limitation before serum was given, afterwards healed with remarkable rapidity and without any necessity for surgical intervention or subsequent skin grafting. In other instances, a threatened carbuncle in the form of a large inflammatory swelling, accompanied by marked constitutional disturbance, completely and rapidly aborted without discharge of pus, following administration of one or two doses of 30 c.c. of antitoxin. A few days after the serum had been given, but when the general toxæmia had abated and the infection was well localized, a course of injections of staphylococcus toxoid was instituted, with a view to superimposing on the temporary antitoxic immunity derived from absorption of the serum a more lasting active antitoxic immunity against possible recurrences of infection.

In the paper¹⁴ in which the clinical use of staphylococcus toxoid was first described, it was pointed out that the titre of circulating staphylococcus antitoxin in patients with acute staphylococcal infection of the skin and superficial tissues tends to be below rather than above the average normal. This observation appeared to hold true in these patients with acute carbuncle. The antitoxic titre of their serum, as measured by the anti-hæmolytic power against staphylococcus toxin, underwent on an average a five-fold increase within 3 or 4 days of administering the antitoxin, and showed a fifteen to twenty-fold increase after subsequent completion of the course of toxoid injections.

A single injection of staphylococcus toxoid occasionally produces a rapid maturation and localization of a developing carbuncle, and may induce commencement of healing in established indolent infections of carbuncular type. It would therefore seem legitimate to resort to active immunization from the beginning when the infection appears well localized, and the patient is not acutely ill. But when there are signs

and symptoms of acute toxæmia, with no apparent resistance to the spread of infection, the patient should without delay be given the benefit of the increased degree of immunity ensured by the intramuscular injection of 30 c.c. or 60 c.c. of staphylococcus antitoxic serum.

Acute generalized bullous dermatitis.—This purely descriptive term has been adopted for a group of 3 cases, each of which was diagnosed as acute pemphigus and, alternatively, as acute bullous impetigo. Two of the patients, a newborn female infant and a girl of 3½ years, received 30 c.c. and 100 c.c. of antitoxin, respectively, by the intramuscular route and were unquestionably benefited by it. Indeed the infant had not been expected to recover. In the third case, a boy of nineteen months the results were less conclusive, but here the infection appeared to be due predominantly to hæmolytic streptococci.

Other infections of the skin and subcutaneous tissues by staphylococci.—This somewhat miscellaneous group includes 3 patients who infected a finger or thumb and developed abscesses along the route of lymphatic drainage; 2 cases of acute cellulitis, one of the elbow in a young man, and the other of the chin in a young woman; 1 case of post-operative infection of an extensive and non-united laparotomy wound in a very obese, middle-aged woman; and 1 case of acute suppurative mastitis with homolateral pleurisy, following parturition in a young primipara. Strains of *Staph. aureus*, subsequently proved to be toxigenic, were isolated from every infected focus in these patients, though in no instance could staphylococci be grown by blood culture. These patients were all acutely ill, with high fever and rigors. Gastro-intestinal disturbances, such as repeated vomiting, flatulent distension, and diarrhœa, were common. Obvious jaundice was present in 3 cases, and a definite anæmia was noted in every patient whose red blood cells and hæmoglobin were estimated. One patient received a total of 120 c.c. of staphylococcus antitoxin intravenously, and 80 c.c. intramuscularly. The others received total amounts of from 60 to 240 c.c. intramuscularly. The results for the group may be summarized by the statement that all the patients made a complete and remarkably rapid recovery, although for 3 of them a very poor prognosis was unanimously given by several consultants.

Staphylococcal empyema.—Three patients, aged 12 months, 46 years, and 21 years, all acutely ill with staphylococcal empyema, were given antitoxin intramuscularly, with a view to combating the toxæmia and increasing their resistance against spread of infection, prior to thoracotomy. They received totals of 30 c.c., 120 c.c., and 180 c.c. of antitoxin respectively, following which their condition markedly improved. The first two cases made an early, complete recovery, while the third ultimately developed an extradural spinal abscess with staphylococcal meningitis from which he died six weeks later.

Staphylococcal meningitis and/or brain abscess.—The patient mentioned above who died of meningitis following empyema, and another of a later group, who recovered from a cerebral abscess associated with extensive osteomyelitis of the cranium, might have been placed in this group, but the principle followed has been to classify the cases according to the clinical type of primary infection. This group then comprises 3 cases of staphylococcal meningitis, 1 of meningitis and brain abscess, and 2 of staphylococcal brain abscess. These cases will subsequently be described in some detail, because they illustrate well the value of antitoxin therapy allied to skilful surgery. Indeed, because of the protection given to the patient by the antitoxin and the added confidence afforded the surgeon by the knowledge that antitoxin had been given, it was possible for successful surgical drainage to be performed, where operative procedures would not otherwise have been undertaken.

The amounts of antitoxin received varied from 60 c.c., intramuscularly, given prior to drainage of a brain abscess, to over 600 c.c. given intramuscularly and intracisternally to a patient who made a dramatic recovery from a severe type of staphylococcal meningitis. Antitoxin was also given intrathecally and intraventricularly to other patients in this group. Of the 6 ordinarily rather hopeless cases, only 2 died. In 1 of the fatal cases the infection was complicated by the presence of an unidentified diphtheroid bacillus. Another patient, while recovering from a staphylococcal brain abscess, developed a fatal hæmolytic streptococcal meningitis.

Osteomyelitis without demonstrated staphylococæmia.—Although there would be every

reason to anticipate improved results in the treatment of uncomplicated staphylococcal osteomyelitis from supplementing surgical drainage with antitoxin therapy, this type of infection was not considered very suitable for preliminary assay of the therapeutic value of the antitoxin. Serum administration in such cases would necessarily be more or less coincident in time with surgical drainage; and owing to the difficulty of predicting what the effect of the conventional drainage procedures may be in any one patient with osteomyelitis a large series of this type of infection would have to be considered before the benefit attributable to the serum could be convincingly set forth; whereas osteomyelitis complicated with demonstrable staphylococæmia has a so much worse prognosis that the results of antitoxin therapy are more unequivocally estimated, and this type of case was therefore preferred for the present investigation.

The 3 cases in this group were boys aged 2, 7 and 14 years, who, despite surgical drainage of the infected bone, still appeared acutely ill several days later, with no signs of defervescence. Following intramuscular administration of from 30 to 60 c.c. of antitoxin the temperature and pulse rate fell and general improvement was apparent.

Pyæmia without demonstrated staphylococæmia.—This group comprised 2 adult males acutely ill with a rapid succession of metastatic staphylococcal abscesses, and a third patient who, after having a staphylococcal pansinusitis drained by radical operation, developed multiple pustules and excreted staphylococcal pus in his urine. No bacteriological evidence of staphylococæmia was forthcoming in either case. These patients received totals of 360 c.c., 480 c.c., and 50 c.c. of antitoxin intramuscularly. They all made complete recoveries, the improvement in their general condition, and cessation of further metastatic abscess formation dating in each case from the first administration of serum.

Staphylococæmia in children secondary to osteomyelitis.—Before attempting to assay the value of staphylococcus antitoxin in this and the remaining two groups of the paper, the term "staphylococæmia" requires brief consideration. This was preferred to the terms "bacteriæmia" and "septicæmia" which are in common usage, and between which it is conventional to attempt to draw an arbitrary and probably false distinction. The term "staphylococæmia" is

based upon the simple bacteriological observation that toxigenic staphylococci were present in a relatively small volume (a few c.c.) of the patients' blood. Quantitative blood culture gives some indication of the number of staphylococci in 1 c.c. of patients' blood, and was customarily done several times during the course of the disease. If, as happened in one case in this series, a surgeon while knocking a window in an infected bone, also knocks staphylococci into the blood stream, so that, although blood culture is sterile before operation, blood taken immediately after operation grows about 380 colonies of staphylococcus aureus per c.c., the prognosis for that patient is at once considerably more grave. And if the patient be promptly given 60 c.c. of staphylococcus antitoxin intramuscularly, and next day and thereafter the blood culture proves again sterile, it seems mere casuistry to argue that this is an instance of bacteraemia and not of septicæmia. On the other hand, the claim is legitimate, and possibly well-founded, that the prognosis is better when demonstrable staphylococæmia dates from the time of operation rather than from the time of admission to hospital. All but 4 of the 32 patients in this group had a positive blood culture on admission. In these 4 exceptions the post-operative blood culture only was positive.

Most of the children appeared gravely ill, very high fever and disproportionately high pulse rate, delirium, cyanosis, and dilated pupils being regarded as of particularly serious import. Of the 32 children under 14 years of age in this group 10 died. Seven of these fatal cases were obviously moribund when serum was given. One among the remaining 3 critically ill patients who succumbed appeared to be making headway against a very severe staphylococæmia, although no primary focus which could be drained had been located, but finally developed a fulminating streptococcal pericarditis. There are few if any surgeons who would put at less than 50 per cent the general mortality rate from osteomyelitis with pre-operative staphylococæmia in children. The mortality rate in this series of 32 was only 31 per cent, although if any process of case selection were at work it would certainly have favoured the inclusion of the more severe types of case. But in this particular investigation, the clinical outlook for the individual patients if specific treatment were not given, rather

than statistical considerations, provides the criterion by which the efficacy of the specific treatment should be adjudicated. For those children who died the prognosis was almost uniformly hopeless; while many of those who recovered after antitoxin therapy would undoubtedly have had otherwise a very poor chance of survival.

The original plan of specific treatment was to give rather large doses of serum intravenously, but this was later abandoned on account of the severe hyperthermic reactions occasioned by this route of administration. Intramuscularly, a larger total dosage had to be given, as a rule not less than 60 c.c. a day, continued, in general, until the fever was lower, the pulse stronger, the mentality clearer, the colour and appetite improved, the blood culture sterile or the colony count much diminished, and the anti-hæmolytic titre of the serum had risen to a steady high level. Thereafter the common practice was to give 30 c.c. daily until three successive blood cultures had proved sterile. For very severe cases the average total serum requirements have been from 200 to 600 c.c. intramuscularly, or from 100 to 300 c.c. intravenously. Improvement tended to become definite in this disease, as in the other types of staphylococcal infection which have been considered, at a time when the anti-hæmolytic titre of the patient's serum underwent a sudden rise, indicating that more antitoxin was either being absorbed into or retained in the circulation. This increase in circulating staphylococcus antitoxin was in several instances accompanied by a marked leucocytosis. The residual disability of these patients and the danger of recurrences of infection were minimized as far as possible by the administration of a series of injections of staphylococcus toxoid during convalescence.

Under antitoxin therapy a certain proportion of patients lost their acutely ill appearance and their unremitting temperature, but continued to develop metastatic abscesses and to run a swinging fever, although repeated blood cultures were negative. Such abscesses were not always drained as promptly and as adequately as they should have been and the patients became terribly emaciated and anæmic. The importance of early and efficient surgical drainage of every accessible focus containing frank pus cannot be over-emphasized. And in our view,

any method of post-operative care which involves sealing up purulent discharges at the site of infection should be definitely condemned. On the other hand, premature incision of inflammatory foci containing no pus is to be deprecated. Such metastatic foci have sometimes completely resolved after administration of the antitoxin.

Staphylococcæmia in children not secondary to osteomyelitis.—Despite the difficulties inherent in the adequate drainage of osteomyelitic foci and the possibility that trauma incident to drainage procedures may aggravate the degree of blood stream infection, such foci can often be located and drained at a fairly early stage. Whereas, when the major focus discharging staphylococci into the blood stream remains for some time undetermined, or proves inaccessible, an unsupportable degree of staphylococcæmia and toxæmia may very soon be present. The prognosis of the latter miscellaneous group is accordingly worse than that of the former, and the two groups have been differentiated here chiefly on that account.

As will be made clear in a subsequent review of the cases in this group, there was good reason to regard all of them as having a hopeless prognosis. Two boys, however, made excellent recoveries following intravenous antitoxin therapy. One, aged 2 years, who on admission to hospital presented an acute follicular tonsillitis and cellulitis of the foot with staphylococcæmia, received a total of 315 c.c. intravenously. The other, aged 13 years, showed no localization of infection until a late stage of the disease, after receiving a total of 105 c.c. of antitoxin intravenously and 15 c.c. intramuscularly.

Staphylococcæmia in adults and adolescents.—The survival of 5 among 22 adults and adolescents with staphylococcæmia given antitoxic serum would be encouraging statistically only if one held the view, to which some clinicians subscribe, that in this age-group the disease is always fatal. But considered as a group, the patients who died could not have been expected to survive, because there was often undue delay before the correct diagnosis was arrived at, and then always a further delay, amounting in most instances to several days, before serum therapy was instituted; and, considered as individuals, all were in desperate condition at the time serum was given, a fact which autopsy

findings in several cases subsequently confirmed. On the other hand, the 5 survivors, according to the judgment of experienced clinicians whose patients they were, had also little or no chance of recovery.

Antitoxin was given intravenously to most of the patients in this group, and usually occasioned a severe reaction about a half to one hour later. These serum reactions were characterized by rigors, restlessness sometimes verging on delirium, and then circulatory collapse and hyperthermia. Despite the severity of these reactions, a number who eventually died of broncho-pneumonia and heart failure lived several days longer than was at first anticipated. A few hours after serum administration some of these patients showed a remarkable improvement. They felt comfortable, had a normal temperature and renewed appetite, and were mentally alert.

The patients who made complete recoveries received the following total amounts of antitoxin:— 150 c.c. intravenously and 30 c.c. intramuscularly; 530 c.c. intramuscularly; 180 c.c. intramuscularly; 1,700 c.c. intramuscularly; 540 c.c. intravenously and 480 c.c. intramuscularly. Case-histories of these patients will be given in a forthcoming publication in this *Journal*, when the symptomatology and the etiology of the disease in this group of 22 patients will be briefly reviewed.

CONCLUSIONS

Evidence has been presented to indicate that the dangers of acute staphylococcal infection are largely derived from the *in vivo* production of staphylococcus exotoxin, and the rationale of treating such infections with antitoxic horse serum has been expounded. Carbuncles and staphylococcal infections of the skin and subcutaneous tissues may undergo rapid and dramatic improvement following intramuscular administration of the serum. Antitoxic serum therapy has undoubtedly proved a life-saving measure in many instances of osteomyelitis with staphylococcæmia in children, and in a few instances of pyæmia and staphylococcæmia in adults.

The limitations of antitoxin therapy in any disease apply perhaps with special significance to staphylococcal infections and toxæmias. Damage may be done to vital organs by the rapidly-produced and rapidly-acting staphylococcus

toxin which no amount of antitoxin subsequently added to the circulation can undo. Moreover, in generalized staphylococcal infection, there is opportunity for toxin to be formed at many sites simultaneously, while additional burdens in the form of focal nephritis and broncho-pneumonia are often placed at an early stage upon the kidneys and lungs. Early diagnosis must therefore remain essential to the success of antitoxin therapy in this disease. This can usually be made conclusively if a carefully-performed blood culture grows toxigenic staphylococci. Reports of positive blood culture for staphylococcus, which truly established the diagnosis in a clinically obscure illness, have often been ignored on the grounds that they represented the result of contamination. It is of little avail to consider the use of specific antitoxin therapy when the patient is moribund, hopelessly toxic, and riddled with metastatic abscesses.

The large quantities of serum required, particularly when staphylococcaemia is present, and the severe reactions which have followed its intravenous administration, are drawbacks which can probably be to some extent remedied as further experience accumulates in regard to methods of immunizing horses and of concentrating their plasma. But, even if far more potent staphylococcus antitoxins eventually become available, and their reaction-producing properties when administered intravenously can be only slightly diminished, liberal dosage and the intravenous route may still have to be advocated for the treatment of staphylococcaemia in adults, except when gross pulmonary lesions are present. This particular class of patient ill withstands intravenous injection of the concentrated staphylococcus antitoxins used in this investigation. In the treatment of osteomyelitis and staphylococcaemia in children quicker results might have been obtained with lesser quantities of serum if it had been more often possible to administer the serum intravenously, so that a higher titre of circulating antitoxin could have been rapidly induced.

Though much remains to be done in regard to the mode of preparation, the determination of the optimum amount, the route, and the time-intervals of administration of staphylococcus antitoxin, its therapeutic value seems already indisputable.

SUMMARY

1. Laboratory and clinical evidence has been marshalled which points strongly to the probability that the severity of certain types of staphylococcal infections is due to the formation of exotoxin *in vivo* by the infecting micro-organisms.

2. An account is given of the preparation of staphylococcus antitoxic horse serum, and of those of its properties which are probably of therapeutic value.

3. The results obtained within the past two years in the Dominion of Canada in the treatment with antitoxin of 104 cases of acute staphylococcal infections and toxæmias are classified and discussed.

4. Among the 104 patients were 24 with various types of staphylococcal infection of skin and subcutaneous tissues, all of whom made remarkably rapid recoveries following serum therapy; 32 severe cases of staphylococcaemia secondary to osteomyelitis in children, of whom 22 recovered; and 22 apparently hopeless cases of staphylococcaemia in adults and adolescents, of whom 5 recovered.

5. Clinical improvement seemed to date in many serious cases from the time when the amount of circulating staphylococcus antitoxin reached a maximum high value. As the titre of circulating antitoxin rose, from absorption of the serum administered, an increasing leucocytosis was often, but not always, detectable.

6. Emphasis has been laid upon the necessity for earlier diagnosis of staphylococcal infections and toxæmias and the importance of more prompt institution of specific antitoxin therapy, particularly when a positive blood culture has been reported.

7. Although further improvements in its preparation and in methods of administration must be sought, the conclusion is reached that, when supported by adequate surgical drainage of such pyogenic foci as may be present, staphylococcus antitoxic serum is a specific therapeutic agent of very considerable usefulness.

I desire to record my appreciation of the cooperation of many members of the honorary and resident staffs of the various hospitals where the clinical aspects of this work have been carried out. It is not possible to name specifically every person to whom I am indebted in this way. But acknowledgment should be made of the special facilities afforded by Dr. D. E. Robertson, Chief of Surgery, Toronto Hospital for Sick Children; by Professor W. E. Gallie, Head of the Department of

Surgery, University of Toronto, and Chief of Surgery at the Toronto General Hospital; and by Dr. Alan Brown, Physician-in-Chief at the Hospital for Sick Children, and Head of the Department of Paediatrics, University of Toronto. Twenty children with osteomyelitis and staphylococæmia were treated at the Hospital for Sick Children, Toronto, with the valued help and cooperation of Dr. W. S. Keith. The Montreal patients were treated according to the recommendations of Dr. E. G. D. Murray, Professor of Bacteriology at McGill University, and Consultant Bacteriologist to the Royal Victoria Hospital, who kindly undertook to supervise a trial of the serum in Montreal, and to whom I am especially indebted for encouragement and suggestions.

REFERENCES

1. PARKER, J. T. AND BANZHAF, E. J., *J. Immunol.*, 1927, 13: 24.
2. BURNET, F. M., *J. Path. & Bact.*, 1929, 32: 717.
3. BURNET, F. M., *J. Path. & Bact.*, 1931, 34: 471.
4. GROSS, H., *Zeit. f. Immunitäts. u. exp. Ther.*, 1931, 73: 14.
5. PANTON, P. N., VALENTINE, F. C. O. AND DIX, V. W., *The Lancet*, 1931, 221: 1180.
6. PARISH, H. J. AND CLARK, W. H. M., *J. Path. & Bact.*, 1932, 35: 251.
7. DOLMAN, C. E., *Canad. Pub. Health J.*, 1932, 23: 125.
8. KELLAWAY, C. H., MACCALLUM, P. AND TEBBUTT, A. H., Report of the Royal Commission into Fatalities at Bundaberg, 1928.
9. NEISSER, M. AND WECHSBERG, F., *Zeit. Hyg. u. Infektionsk.*, 1901, 36: 299.
10. PARKER, J. T. AND GUNTHER, A., *J. Exp. Med.*, 1931, 54: 315.
11. PANTON, P. N. AND VALENTINE, F. C. O., *The Lancet*, 1932, 222: 506.
12. GROSS, H., *Klin. Wochenschr.*, 1933, 8: 304.
13. CAMPBELL, J. A., *Physiol. Reviews*, 1931, 11: 1.
14. DOLMAN, C. E., *J. Am. M. Ass.*, 1933, 100: 1007.

(To be continued)

THE TREATMENT OF CONGESTIVE HEART FAILURE AND ANGINA PECTORIS BY THE COMPLETE REMOVAL OF THE NORMAL THYROID GLAND*

(A REVIEW OF THE LITERATURE WITH A REPORT OF TWO ADDITIONAL CASES)

BY W. ROLAND KENNEDY, B.Sc., M.D.,

Assistant in Medicine, Montreal General Hospital,
Montreal

ONE of the commonest of disabling conditions is chronic heart disease. It is the most frequent cause of admissions and re-admissions to hospital, and the total number of hospital days involved exceeds that in any other condition. Into this group fall two types of cases: (1) those with congestive failure; and (2) those with heart failure of the anginal variety. There have been striking advances in our ability to diagnose correctly disease of the heart, but the progress in treatment has been comparatively slow. A great number of cardiac patients become refractory to all the ordinary medical procedures. Surgical procedures, however, have recently been directed toward the sympathetic nervous system (cervical sympathectomy; alcohol injection into or extirpation of the dorsal ganglia) for the relief of angina, and have resulted in varying success. Lately, thyroidectomy, either sub-total or total, has been added to the therapeutic armamentarium in the treatment of patients with heart failure and without clinical or pathological evidence of thyroid toxicity.

REVIEW OF THE LITERATURE

An adequate flow of blood to the tissues implies, in the first place, that an adequate amount of blood must be expelled from the heart per unit of time, and in the second place that this

blood must be transported to the sites of utilization at an adequate speed. Blumgart¹ and his co-workers have demonstrated that normally the velocity of the blood flow is directly determined by the metabolic demands of the body. These demands are best gauged by the basal metabolic rate. When the metabolic rate is accelerated, as in thyrotoxicosis, the speed of blood flow is proportionately increased; similarly, when the metabolic rate is depressed, as in myxœdema, the velocity of blood flow is correspondingly lowered. They have also shown that patients with compensated heart disease have a blood velocity within normal limits in accord with the normal level of the basal metabolic rate, whereas in patients with congestive heart failure, in spite of a normal metabolic rate, the velocity of blood flow is considerably slowed. Symptoms and signs of cardiac decompensation are present in proportion to the degree of slowing of the blood velocity. They conclude that circulatory insufficiency consists in the failure of the heart to maintain a blood supply adequate to the ordinary needs of the tissues at any given metabolic level. The fact that patients with myxœdema show no evidence of circulatory insufficiency with the speed of blood flow the same as that of decompensated persons, namely, lowered, demonstrated that the adequacy of a given speed of blood flow can be decided only in relation to the

* Read before the McGill Reporting Society, on April 9, 1934.

metabolic needs of the tissues. Therefore, if the normal basal metabolic rate of a patient with congestive heart failure be reduced, his blood supply may still be sufficient for the lowered needs of his body. In terms of the law of supply and demand the supply of blood in such a patient would not be increased, but the metabolic demands of his body would be decreased in conformity with his blood supply. It would appear, then, that the way to relieve the circulation is to decrease the load on it by lowering the basal metabolic rate. This physiological work suggested that when the metabolism is low there need be no objective or subjective evidence of cardiac failure, even when the circulation is sluggish and the rate of blood flow diminished. When the basal demands are diminished the lowered state of circulation is ample to meet the requirements of the body.

The same considerations are equally applicable to angina pectoris. The higher the metabolic rate, the greater is the output of the heart and the velocity of the blood flow. Consequently the increased work of the heart demands an increased coronary blood supply. The blood supply to the heart must be greater at a normal metabolic rate than at the lower rate of myxœdema. With arteriosclerotic narrowing of the coronary vessels, the blood supply to the heart may be inadequate to the needs of a normal metabolic rate, although sufficient for the needs of the heart at a lower metabolic rate. Lowering of the metabolism in patients with angina affords relief in several different though related mechanisms: (1) decreased amount of work performed by the heart; (2) decreased metabolism of the heart itself; (3) decreased sensitivity to epinephrine.

The earliest observers noted the frequent occurrence of congestive heart failure or angina pectoris in thyrotoxicosis and the disappearance of the symptoms and signs after thyroidectomy. In contradistinction, no evidence of heart failure or of organic cardio-vascular disease was found attributable to myxœdema by Willius and Haines² in 162 such cases, and Means, White and Krantz,³ and also Christian,⁴ subscribe to this view. It has also been appreciated that thyroid extract in the treatment of myxœdema more frequently precipitates than alleviates circulatory insufficiency. The rise in the basal metabolic rate thus produced, and the proportionate increase in the speed of the blood flow,

which connotes an increased amount of work on the heart, explains why such patients may develop angina pectoris or circulatory failure.

The initial idea for the introduction of thyroidectomy in the treatment of heart failure was advanced by Rosenblum and Levine.⁵ In a patient with advanced congestive failure and auricular fibrillation complicating hypertensive heart disease sub-total thyroidectomy was performed because of the possibility of latent hyperthyroidism. Pathologically, the thyroid gland was found normal. However, there was marked clinical improvement lasting four years. This raised the question of possible application of the above principles in the treatment of patients with intractable cardiac failure, but with normal thyroid tissue. In subsequent cases studied by Blumgart, Levine and Berlin⁶ it became clear that the ordinary sub-total thyroidectomy was not always sufficient to produce lasting improvement. It was found that the basal metabolic rate would fall to about minus 15 per cent, and with this fall the circulation was improved. Within several weeks the basal metabolic rate was found to rise again, and the patient's condition became worse. It was evident that the remaining thyroid tissue was capable of rapid regeneration or, at least, of compensating in its function. Because of this uncertainty of leaving varying amounts of glandular tissue behind which might regenerate and again raise the metabolic rate, complete removal was suggested by Blumgart⁶ and his associates for the permanent lowering of the basal metabolism. This would obviate the necessity of a second operation which frequently is unsuccessful in removing the remaining thyroid tissue because of adhesions and accompanying hazards.

The desirability of permanently lowering the metabolic rate by means less drastic than surgery presented itself. Roentgen irradiation of the thyroid gland had been used for many years in the treatment of toxic goitre and malignant conditions of the thyroid. Phahler and Vastine⁷ reported upon 400 such cases, 13 of which were simple goitre, 241 of the hyperplastic type, of which 238 were exophthalmic and 119 adenomatous, 92 of this last group being non-toxic and 26 toxic. There were, in addition, 2 cases of thyroiditis and 26 cases of carcinoma of the thyroid. As a result of this form of treatment hypothyroidism developed in only 4 cases (1.7 per cent). Other observers, Means and Holmes,⁸

Simpson,⁹ Jenkinson,¹⁰ Grover,¹¹ Bowing,¹² and Ginsburg¹³ concluded also that it was difficult to produce myxœdema by roentgen irradiation or by radium in various thyroid diseases. Friedman and Blumgart¹⁴ concluded that roentgen irradiation of the normal thyroid gland, used alone or as an adjunct to maximal sub-total thyroidectomy, failed to produce any appreciable persistent lowering of the basal metabolic rate in 6 patients with chronic heart disease. Whether antithyroidal substances now being developed will lower the metabolic rate permanently is a problem for the future.

The operative technique for the total ablation of the thyroid gland was described by Berlin.¹⁵ In the series of cases reported by him the patients tolerated the operation well, in spite of their long-standing cardiac disability. In the customary thyroid operations the danger zone, the region of the parathyroids and the recurrent laryngeal nerves, is left strictly undisturbed, but in total ablation the zone is invaded. The parathyroids are isolated and the thyroid gland is totally removed in continuity. After the removal of the thyroid the gland is carefully searched for imbedded or adherent parathyroids, and, if found, they are re-implanted in the sterno-mastoid muscle in accordance with the technique adopted by Lahey.¹⁶ In both of the series, Blumgart *et al.*^{6, 17} and Levine *et al.*,¹⁸ the cases had been carefully controlled before operation by long periods of observation, so as to rule out the factor of spontaneous recovery and so that any benefit that the patients derived could be attributed only to the operative interference. In all of the above cases the thyroid gland revealed normal tissue on pathological examination. Also, clinically, there was no evidence of thyroid over-activity.

The selection of cases was an important matter. The favourable cases were those suffering from angina and congestive heart failure; the unfavourable were those with active coronary disease, active rheumatic infection, repeated pulmonary infarction, recent vascular accidents, or syphilitic cardio-vascular disease, because of its usually rapidly progressive course. In this group also were cases with cirrhosis of the liver or nephritis as an associated condition, because persistent œdema might be due to these disorders alone independently of the cardio-vascular condition. The operative mortality in Berlin's^{6, 17} series was only 1 in 10 cases, and

this patient was 62 years of age and had had congestive failure for years. Pulmonary complications were the cause of death. In the group reported by Levine *et al.*¹⁸ the operative mortality was 1 in 12.

Total ablation of the thyroid gland caused a persistent lowering of the basal metabolic rate in all cases. There seemed to be, according to Levine,¹⁸ a distinct lag between the fall of the metabolism and the clinical evidence of myxœdema. Even with a minus 20 per cent basal metabolic rate there was no subjective or objective evidence of myxœdema in the early course. At a later date, although the rate was no lower, slight clinical myxœdema developed in 5 of 12 cases. This was easily controlled by oral thyroid administration and thereby the metabolic rate was kept at the desired level. It generally took from 4 to 6 weeks for the fall in the basal metabolic rate to occur.

The effect of the total ablation of the thyroid on patients suffering from angina was surprisingly good. In Levine's¹⁸ series there were 4 cases with angina; 3 were completely relieved, and the fourth obtained slight improvement. In patients with congestive heart failure similar good results were found. The patients were calmer and experienced less pounding of the heart. There was lessening of the cyanosis and the symptoms and signs of cardiac failure were greatly improved or disappeared. There was a gain in weight. The patients became ambulatory after being bed-ridden for months and years, and, frequently, they resumed their previous occupations. The improvement paralleled the fall in the basal metabolism.

In patients with cardiac disease under medical procedure alone, with clinical improvement, the metabolic rate remained unchanged, but there was increased velocity of blood flow. Post-operatively, the velocity of the blood flow remained slow and, in fact, was definitely slower than before operation (Blumgart¹⁷). This indicated that after total ablation of the thyroid the heart did not work as hard as it showed itself capable of working before the operation. This difference may be termed a new cardiac reserve.

After total ablation there were no significant changes in the blood pressure. The electrocardiogram showed decrease in voltage of the QRS complexes in 7 cases, and flattening of the T waves in one or more leads in 4 cases. There

was increased ability to perform exercise tolerance tests. Beneficial effects were noted in cases with hæmoptysis as a complication. In one case bronchial asthma of many years' duration ceased. Premature contraction of the heart disappeared. Less encouraging results were obtained in patients with paroxysmal dyspnoea. Iodine was not used at any time because it had been shown previously that this drug did not lower the basal metabolic rate in patients with normal thyroid tissue.

Two cases are now presented from the medical and surgical services of the Montreal General Hospital, in each of which there was chronic heart disease and upon which total thyroidectomy was attempted.

CASE 1

(6581-32 M.G.H.; Service, Dr. A. H. Gordon. Rheumatic heart disease; aortic stenosis and insufficiency; mitral insufficiency and stenosis?; cor bovinum; adherent pericardium; active rheumatic infection; severe angina; slight congestive failure. This patient was a male, 22 years of age. He had had rheumatic fever at the age of 6 years. Ever since he had noted marked præcordial pulsation and had never been able to work because of this disability. From July, 1929, until admission in November, 1932, he had suffered from attacks of severe præcordial distress of the anginal type, which increased in frequency and severity and were practically constant even when resting in bed. Just previous to admission slight oedema of the legs was noted, but this was never a feature during his hospitalization. While in hospital he had periodic bouts of migratory arthritis typical of rheumatic fever. He also weathered an attack of pneumonia. There was moderate pallor. The heart condition was as noted above. Striking was the marked cardiac enlargement, the left border measuring 17 cm. from the mid-sternal line, and the right, 6 cm. The marked cardiac pulsation was so pronounced that the left clavicle was dislocated at the inner end with each heart beat. The blood pressure was 150 systolic; 0, diastolic. The urine repeatedly showed albuminuria with hyaline and granular casts but no hæmaturia. There was always a moderate leucocytosis. Subacute bacterial endocarditis was suspected, but blood cultures were negative on several occasions. It was pathetic to see the patient in the bouts of anginal pain. Many electrocardiograms always showed the same features, namely, intraventricular block, inversion of T waves in all leads, the QRS complex widened and notched. All this indicated grave myocardial disease with coronary occlusion. The blood chemistry was normal. The blood Wassermann was negative. The renal test meal gave 6-point variation, and the day urine exceeded the night urine in amount.

All known vaso-dilator drugs were used without success in attempting to relieve him of the angina. Morphine hypodermically was given several times daily with only partial relief. In fact, he was to all intents a morphine addict, using as much as 8 grains a day. Novocaine, and subsequently alcohol injection into the upper dorsal nerve roots, at first gave relief, but soon this also failed to alleviate his suffering.

Then the above mentioned works of Blumgart *et al.*¹⁷ and Levine *et al.*¹⁸ came to our attention, and decision was made to proceed accordingly as a last resource. The patient was willing to attempt anything for relief. The basal metabolic rate was, to our surprise, plus 31, plus 27, plus 31, on three different occasions. There were no eye signs, tremors or other findings suggesting thyrotoxicosis. The thyroid was not palpable.

Finally, after one year of hospitalization without any improvement after every kind of therapeutic trial, total thyroidectomy was performed on November 22, 1933, under nembutal morphine-novocaine anaesthesia. The operation was uneventful. The thyroid gland was small and deeply placed, and was fixed to the trachea. Dissection of the thyroid gland was completed, leaving only thyroid tissue equivalent to about 1/10th of a normal lobe. Because of the difficulty in rotating the lobe outwards no more tissue could be safely removed without danger to the recurrent laryngeal nerves.

Pathological examination of the thyroid tissue revealed a normal gland. There was no relief from the angina for the first week and the basal metabolism remained the same. Lugol's solution was then given in doses of three minims daily. After this there was complete relief from pain, except for an occasional slight recurrence, when there was an associated febrile reaction due to intercurrent infection. There was a gradual fall in the basal metabolic rate to plus 1 on January 24, 1934. During the first two weeks of March there was a rise in the basal metabolic rate to plus 27 and plus 26 on two separate occasions. In the first instance it was presumably due to an acute arthritis and the second rise was due to an upper respiratory infection. On each occasion there was no recurrence of the angina. In spite of this set-back there has been progressive improvement. Iodine was discontinued, and the basal metabolic rate has remained persistently low. He is up and about the ward doing various odd jobs. A gain of 14 pounds in weight has been obtained. During the first year of hospitalization he was bedridden, but now he is ambulatory. He has experienced much less pounding of the heart. No clinical evidence of myxoedema has been noted. The other laboratory findings remain unchanged.

Comment.—Definite improvement has occurred in this patient. Angina has ceased. Morphine was long ago discontinued. He has become ambulatory. This has taken place even with evidence of active rheumatic infection. It is admitted that only maximal sub-total thyroidectomy was performed, because total was impossible. The improvement in symptoms is felt to be attributable to the fall in the basal metabolic rate resulting from the thyroidectomy. The improvement noted with the administration of Lugol's solution was most likely only a coincidence, because the time for the fall in the basal metabolic rate to occur is usually in the second week. Also it has been previously mentioned that iodine has no effect upon the basal metabolic rate of persons with normal thyroid tissue. The high basal metabolic rate before operation is not an uncommon finding. Lev and Hamburger¹⁹ conclude that 75 per cent of cases of organic heart disease with decompensation show an increased basal metabolic rate of an average of 39 per cent above normal; that the increase is not related directly to the type of heart involvement, arrhythmia, cyanosis or oedema, but seems to vary only with the degree of decompensation and the cardiac and respiratory rate. The high basal metabolic rate decreased gradually with the return of compensation. They sug-

gested that the increased work of the heart and the increased activity of the muscles of respiration were responsible for this finding. It is felt that a lower basal metabolic rate was not obtained, primarily due to the presence of active rheumatic infection in the above case.

CASE 2

(1222-34, M.G.H.; Service, Dr. C. P. Howard). Congenital heart disease with cyanosis; polycythæmia; slight congestive failure; angina. This patient was a female, 20 years of age. Cyanosis had been present since birth. She had a moderately active life with only slight dyspnoea till one year before admission. Then she began to experience attacks of severe chest pain radiating to the left arm with dyspnoea. These were characteristic of angina. Also there was slight swelling of the feet and occasional nose-bleeds. On examination there was marked cyanosis with pronounced polycythæmia. The red blood cell count varied between 7.6 and 9.1 millions, with the hæmoglobin as high as 167 per cent. There was clubbing of the fingers and toes. The heart was moderately enlarged, to the right, 2.5 cm., to the left, 11 cm., and the only abnormality was the presence of a moderate pulmonic systolic murmur. No thrill could be palpated. The electrocardiogram showed marked right axis deviation. At a later date she had hæmoptysis. During 1933 the patient was admitted four times to the hospital, always with the same complaints.

On one occasion 5 hypodermic injections of morphine did not relieve the pain. The various vaso-dilator drugs gave no relief. Alcohol injection of the upper thoracic nerve roots of the sympathetic ganglia gave only temporary relief and then failed. Ganglionectomy was contemplated, but thyroidectomy was substituted because of the less risk involved, and because of the previous experience. On January 17 and 25, 1924, the basal metabolic rates were plus 9 and plus 7, respectively. On February 7th, total ablation of the thyroid was performed. The operation was well tolerated. The thyroid tissue presented a normal histological appearance. The metabolic rate fell to minus 1 per cent on February 18th, and to minus 22 per cent on March 17th. To date there has been no recurrence of the angina or œdema. Cyanosis appears less marked. The dyspnoea is improved. There is no further need of morphia. The patient is again ambulatory and has been discharged.

Comment.—In this patient there has been complete relief of angina and congestive symptoms attributable only to the thyroidectomy. In addition to the slowing of the blood flow resulting from the congenital heart disease there was retardation of the velocity of blood flow owing to the polycythæmia, as Blumgart¹ has shown in such cases alone. With the lowering of the basal metabolic rate equilibrium was established between the metabolism and the velocity of blood flow, and subsequent relief of the angina resulted.

SUMMARY

1. A review of the literature published by two groups of workers, Blumgart *et al.* and Levine *et al.* demonstrates the usefulness of total

ablation of the normal thyroid gland in the treatment of patients with cardiac failure but without clinical or pathological signs of thyroid toxicity. The improvement parallels the fall in the basal metabolic rate thereby produced. Permanent lowering of the basal metabolic rate is necessary for lasting improvement.

2. Two cases of non-thyrotoxic chronic heart disease are presented. Each one had severe angina refractory to all forms of medical treatment, including alcoholic injection of the dorsal sympathetic ganglia. There was also slight congestive failure. Thyroidectomy was performed in each patient and as much thyroid tissue as possible was removed. The gland was normal on pathological examination. Marked improvement in each case followed the operation, and seemed attributable only to it. The basal metabolic rate was reduced in both patients by the thyroidectomy.

3. From this experience it is suggested that the removal of as much thyroid tissue as possible will benefit selective cases of chronic intractable heart disease without clinical or pathological evidence of thyroid toxicity.

The writer expresses his thanks to Drs. A. H. Gordon, C. P. Howard, and E. M. Eberts, for permission to report these cases. Dr. Eberts performed the thyroidectomy in each case. The alcohol injections into the dorsal nerve roots were given by Dr. H. M. Elder. The writer is also indebted to Drs. Blumgart and Levine with their co-workers, whose articles have been freely used in this present paper.

REFERENCES

1. BLUMGART, H. L. AND WEISS, S., *J. Clin. Investigation*, 1927, 4: 15; *ibid.*, 1927, 4: 149; *ibid.*, 1928, 5: 343; *ibid.*, 1928, 5: 379.
2. BLUMGART, H. L., GARGILL, S. L., GILLIGAN, D. R., *ibid.*, 1930, 9: 69; *ibid.*, 1931, 9: 679; *ibid.*, 1930, 9: 91.
3. WILLIUS, F. A. AND HAINES, S. F., *Am. Heart J.*, 1925, 1: 67.
4. MEANS, J. H., WHITE, P. D., AND KRANTZ, C. T., *J. Am. M. Ass.*, 1925, 84: 345.
5. CHRISTIAN, H. A., *Pennsylvania M. J.*, 1928, 32: 70.
6. ROSENBLUM, H. H. AND LEVINE, S. A., *Am. J. M. Sc.*, 1933, 185: 219.
7. BLUMGART, H. L., LEVINE, S. A. AND BERLIN, D. D., *Arch. Int. Med.*, 1933, 51: 866.
8. PHAHLER, G. E. AND VASTINE, J. H., *Am. J. Roentgenol.*, 1930, 24: 395.
9. MEANS, J. H. AND HOLMES, G. W., *Arch. Int. Med.*, 1923, 31: 303.
10. SIMPSON, C. A., *Radiology*, 1924, 3: 427.
11. JENKINSON, E. L., *Radiology*, 1925, 4: 453.
12. GROVER, T. A., CHRISTIE, A. C., MERRITT, E. A., COE, F. O. AND McPEAK, E. M., *J. Am. M. Ass.*, 1929, 92: 1730.
13. BOWING, H. H., *Am. J. Roentgenol.*, 1927, 18: 501.
14. GINSBURG, S., *Am. J. Roentgenol.*, 1930, 24: 283.
15. FRIEDMAN, H. F. AND BLUMGART, H. L., *J. Am. M. Ass.*, 1934, 102: 17.
16. BERLIN, D. D., *Am. J. Surg.*, 1933, 21: 173.
17. LAHEY, F. H., *Surg., Gyn. & Obst.*, 1926, 42: 508.
18. BLUMGART, H. L., RISEMAN, J. E. F., DAVIS, D. AND BERLIN, D. D., *Arch. Int. Med.*, 1933, 52: 165.
19. LEVINE, S. A., CUTLER, E. C. AND EPPINGER, E. C., *New England J. Med.*, 1933, 209: 667.
20. LEV, M. W. AND HAMBURGER, W. W., *Am. Heart J.*, 1925, 1: 240.

RESISTANCE TO ROUS SARCOMA*

BY F. G. BANTING AND S. GAIRNS,

*Department of Medical Research, Banting Institute, University of Toronto,
Toronto*

I.

THIS paper is a report on seven chickens in this laboratory found resistant to Rous sarcoma following routine transplantation during the years 1928 to 1933.

A study of Rous sarcoma has been made in pure-bred barred rock chickens obtained from the Ontario Agricultural College. The birds used were fully grown, young chickens from 6 to 12 months old. During the spring months the birds were from 3 to 6 months old. The age of the bird is an important factor, because in young birds Rous sarcoma develops more readily and kills more rapidly than in old ones. Gye used young chicks, and reports that in 6,000 birds he found only one in which a tumour regressed.

In order to have a constant supply of tumour tissue for experimental purposes three to six normal chickens are transplanted every week. Transplants are made into the muscle of both breasts with a trochar of about 2 mm. diameter. When tissue is required the chicken with the most rapidly growing tumour is killed, and thus the birds with the more slowly growing tumours are allowed to survive.

TABLE I
ROUS SARCOMA TRANSPLANTS

Year	Transplanted	Killed for tumour tissue	Died of tumour	Resistant birds
1928	276	90	186	0
1929	245	88	157	0
1930	333	98	233	2-(373, 194)
1931	292	110	181	1-(440)
1932	313	116	197	0
1933	309	119	185	4-(3100, 3101, 3262, 3378)
6 years	1,768	621	1,140	7

In the six year period, 1928 to 1933 (see Table I), 1,768 chickens were transplanted. Of these, 621 were killed to obtain tumour tissue; of the remaining 1,147 birds 1,140 died of tu-

mour and 7 became resistant to Rous sarcoma, i.e., 1 bird in 164. Two of these resistant birds were found in 1930 (chickens 373 and 194); one in 1931 (chicken 440); and four in 1933 (chickens 3100, 3101, 3262 and 3378). A resistant bird is one in which a well-established tumour regresses; on additional transplantation, a small, round nodule of less than 1 cm. in diameter may develop, which also regresses; the bird does not die of Rous sarcoma.

Chicken 373 is reported in detail as an example of a resistant bird. On December 26, 1930, it received a transplant in both breasts. Small tumours developed which regressed, and on February 12, 1931, a small nodule in the right breast was all that remained of them. The bird was re-transplanted in both breasts on February 13, 1931, and nodules were observed on both sides on February 20th. On March 5th the nodule of the right breast had regressed, but a nodule remained in the left. On March 6th the serum of this bird was tested against a potent Rous tumour extract. Nine cubic centimetres of serum of bird 373 were mixed with 3 c.c. of tumour extract and incubated at 37°C. for one hour. Three normal chickens each received 4 c.c. of this mixture in the left breast muscle. The three birds remained negative for six weeks, at the end of which time they were given a direct transplant. They all became positive and died in 18 to 24 days. As a control, the serum of a normal chicken was mixed with the same tumour extract in the same proportions and incubated for the same time. The three birds which received this mixture developed tumours and died within 22 days. The same amount of the tumour extract incubated with normal saline killed three birds within 23 days. On March 13th, both breasts of chicken 373 were clear and the bird was re-transplanted on both sides. Following this third transplantation the bird remained negative and no nodules developed. From March, 1931, to August, 1933, bird 373 was

* Read before the Section of Medicine, Toronto Academy of Medicine, on March 13, 1934.

transplanted on 13 occasions and received as many as eight transplants at a time. The bird did not show any signs of tumour during this period. Control birds were transplanted on each occasion and all died positive or were killed for tumour tissue in three to four weeks. On August 1, 1933, bird 373 received 6 c.c. of active tumour pulp which was estimated to contain sufficient tumour-producing substance to kill 5,000 birds. The bird developed a tumour which on August 8th measured 1.4 by 3.5 cm. Ten days later the mass had been absorbed and the breast was quite normal. The bird received transplants in September, October, November and December and remained negative. On December 29, 1933, it received 1 c.c. of an extract of dried Fujinami tumour powder in the left breast. It developed a rapidly growing tumour and died in 35 days with secondaries in the lungs. Histological examination showed that the large breast tumour and the multiple secondaries of the lungs were composed of actively proliferating fibroblasts invading the normal tissues. The tumour was myxosarcomatous in type. The spleen, liver and kidneys showed no signs of secondaries and no areas of fibrosis which might be interpreted as healed Rous secondaries. Blood was obtained from the heart at autopsy and the serum was incubated with Rous extract. The birds which received the serum mixture did not develop tumours, although the control birds died of Rous sarcoma. This indicates that although bird 373 died of Fujinami tumour it still retained its resistance to Rous sarcoma.

Chicken 1038, a resistant bird of another series, received 11 transplants of Rous sarcoma and did not develop a tumour. It received the same dose of Fujinami tumour at the same time as 373, developed a tumour, and died in 49 days.

Chicken 440 received a transplant on February 10, 1931. A tumour developed which regressed, leaving a small cyst. This bird received five more transplants at intervals of about one month, and developed tiny nodules on two occasions, all of which regressed. The serum of this bird was also found to neutralize active Rous tumour extract. The bird died December 15, 1931, and at autopsy no sign of tumour was found and the cyst had disappeared.

Chicken 194 received a transplant on November 7, 1930. A hard heaped-up tumour developed, which on December 12th measured 4.0

by 3.2 cm. A month later the chicken became pale and droopy but the tumour had regressed markedly. By March 5, 1931, only a few tiny nodules were left under the skin and the bird looked quite healthy. On April 22, 1931, the bird received 1 c.c. of Rous tumour extract, following which no tumour developed, although three control birds receiving the same extract developed tumours and died in 24, 23 and 23 days, respectively. On June 3, 1931, the serum of bird 194 was tested with an active tumour extract. Nine cubic centimetres of the serum were incubated with 3 c.c. of tumour extract, and the mixture was given in 4 c.c. doses, to three birds. One bird died of a slowly growing tumour in 43 days, another remained negative, and the third developed a tumour which regressed. This bird became a resistant bird (chicken 796). From June 5, 1931, to January 18, 1934, chicken 194 received 15 transplants and remained negative. This bird is still alive.

The four other resistant birds were met with in 1933, and as a result have not been studied so completely. Chicken 3100 has received five transplants, 3101 has had four, 3262 three, and 3378 only two. These birds developed tumours after the first transplantation, which all regressed and the birds have since been negative. These birds are still alive.

Regression varies with the type of tumour. The slowly-growing, hard, fibrous tumour regresses slowly and disappears completely, leaving a soft normal muscle. A rapidly-growing, soft tumour first develops a line of demarcation between itself and the muscle, it begins to shrink, and the skin over it becomes normal in appearance. The tumour gradually separates from the muscle, and a cyst is formed which may persist for some time.

CONCLUSIONS

1. The development of resistance to Rous sarcoma is rare (7 birds in 1147, a proportion of 1 in 164).
2. The serum of birds in which a Rous tumour has regressed neutralizes active Rous tumour extract.
3. Resistance to Rous tumour does not protect against Fujinami myxosarcoma.
4. The serum of a Rous-resistant bird dying of Fujinami tumour still neutralized active Rous tumour extract.

II.

A ROUS sarcoma growing in a pure-bred barred rock chicken rarely disappears. Our attention was first drawn to regression of a Rous sarcoma by bird 149. On January 18, 1929, bird No. 149 received 1 c.c. of dilute tumour extract mixed with 0.5 c.c. chicken embryo pulp. Ten days later there was a tumour nodule at the site of inoculation. Two other birds receiving the same mixture on the same day died of tumour in 36 and 24 days respectively. The tumour nodule in chicken 149 increased slightly in size and then disappeared. On June 26, 1929, the bird received a tumour transplant which did not grow; the control birds died of tumour in 34 and 19 days respectively. On October 4, 1929, and January 18, 1930, bird 149 received a tumour transplant from which no tumour developed; the control birds in each case died of tumour in the usual time. On July 4, 1930, bird 149 received three transplants in each breast, but no tumours developed. This was repeated on November 25, 1930, and the bird remained negative. The bird developed an infection and died on February 6, 1931. No evidence of tumour tissue was found at autopsy.

Since chicken 149 had received embryo pulp in a previous experiment, it was decided to re-investigate the possibility of developing resistance to Rous sarcoma by the use of embryo pulp. An experiment was planned in which 192 birds were treated with 8-day chicken embryo pulp. The yolk stalk, the structure through which the embryo obtained nourishment, and the whole embryo were included in making the pulp. The birds were treated weekly and received one to fifteen 1 c.c. doses of pulp in the breast muscle. The length of time between the first pulp treatment and the tumour inoculation varied from 7 to 258 days.

During the course of treatment 52 birds died of other causes. The surviving birds were tested for resistance by a direct transplant, or, in the case of 17 birds, by a potent tumour extract. Of the 140 birds tested, all developed a tumour, 5 of which regressed. Three of these birds, Nos. 329, 313 and 71, became resistant.

These three birds had received 10, 10 and 15 doses of pulp respectively, and had been tested with tumour 152, 158 and 226 days, respectively, after their first pulp inoculation. The other two of the five birds, Nos. 217 and 380, became partially resistant. They had received 3 and 6 doses of pulp respectively, and their test tumour inoculation 60 and 63 days respectively after their first pulp treatment. The three resistant birds survived 483, 696 and 639 days following their first tumour inoculation, and during this time they received six additional transplants. No tumours developed after the original tumour had regressed, and the birds did not die of Rous sarcoma. Thus 3 of the 140 treated birds became resistant, *i.e.*, one bird in 46.6.

Bird 71 is reported in detail as an example of a resistant bird.

BIRD 71

August, 1930, to March, 1931.—Chicken 71 received 1.5 c.c. of chicken embryo pulp in the right breast on August 30, September 8, September 16, September 19, September 22, September 30, December 12, December 18, December 26, January 3, 1931, January 14, January 17, March 14, March 23 and March 31.

April 13, 1931.—Received 3 c.c. of tumour extract (3.0 g. tumour tissue: 100 c.c. saline) in left breast, with 4 other similarly treated birds and 3 normal controls.

Treated controls—chicken 72 died of tumour in 23 days; chicken 73 died of tumour in 28 days; chicken 74 died of tumour in 22 days; chicken 76 died of tumour in 35 days.

Normal controls—chicken 567 died of tumour in 24 days; chicken 568 died of tumour in 35 days; chicken 569 died of tumour in 28 days.

April 27.—Tiny nodule, 1.0 x 1.0 cm.

May 8.—Nodule, 1.5 x 2.0 cm.

May 15.—Tumour, 3.4 x 4.0 cm.; hard.

June 15.—Tumour disappeared.

June 16.—Transplanted in left breast, with 3 controls which died in 46 days, 17 days and 17 days.

June 25.—Negative.

July 2.—Negative.

July 23.—Negative.

July 24.—Transplanted in left breast, with 3 controls, 2 of which died in 17 and 18 days; 1 was killed for tumour tissue in 14 days.

July 31.—Negative.

August 5.—Negative.

September 24.—Negative.

October 2.—Transplanted in left breast, with 3 controls, 1 of which died in 27 days; 2 were killed for tumour tissue in 14 and 18 days.

October 27.—Negative.

December 8.—Transplanted in left breast; controls died in 22 and 20 days.

March 15, 1932.—Transplanted in right breast; controls died in 20, 22 and 20 days.

March 30.—Negative.

July 29.—Transplanted in right breast; controls died in 17, 24 and 20 days.

September 8.—Blood drawn for serum tests.

January 11, 1933.—Died; no tumour tissue found at autopsy.

The response of chicken 71 to tumour inoculations is represented in Fig. 2. It will be seen

that following tumour extract this bird developed a tumour which attained its greatest length (4.0 cm.) in one month and a month later had completely regressed. This bird did not develop a tumour on further transplantation.

The tumour which developed in chicken 313 following a direct transplant took a much longer

time to regress. Fig. 1 shows that the tumour reached its maximum length of 7 cm. in one month; during the next six months it varied in size, and finally disappeared, leaving a cyst which was still present when the bird died about a year later.

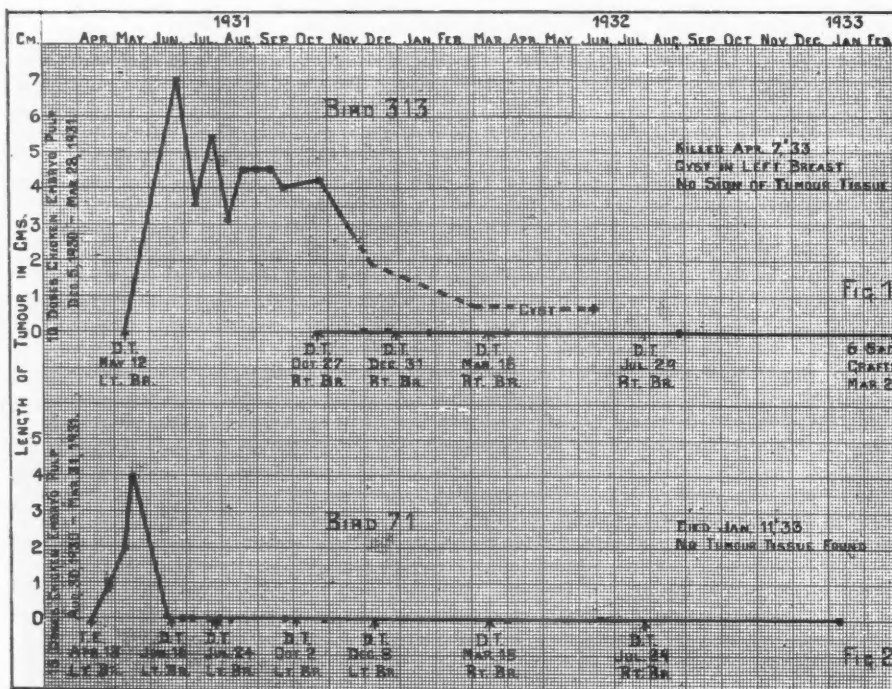
Chicken 329 developed a tumour following its first transplant which reached its maximum size in one month and had entirely disappeared in two months. On a second transplantation it developed a tiny nodule which had entirely disappeared in two weeks. This bird remained negative to subsequent transplantations.

The two partially resistant birds, Nos. 380 and 217, survived 570 and 328 days respectively, following their first tumour inoculation. During this time bird 380 received four transplants and 217 received two. Both birds developed tumour after each transplant and both died of Rous sarcoma. Bird 380 is reported in detail.

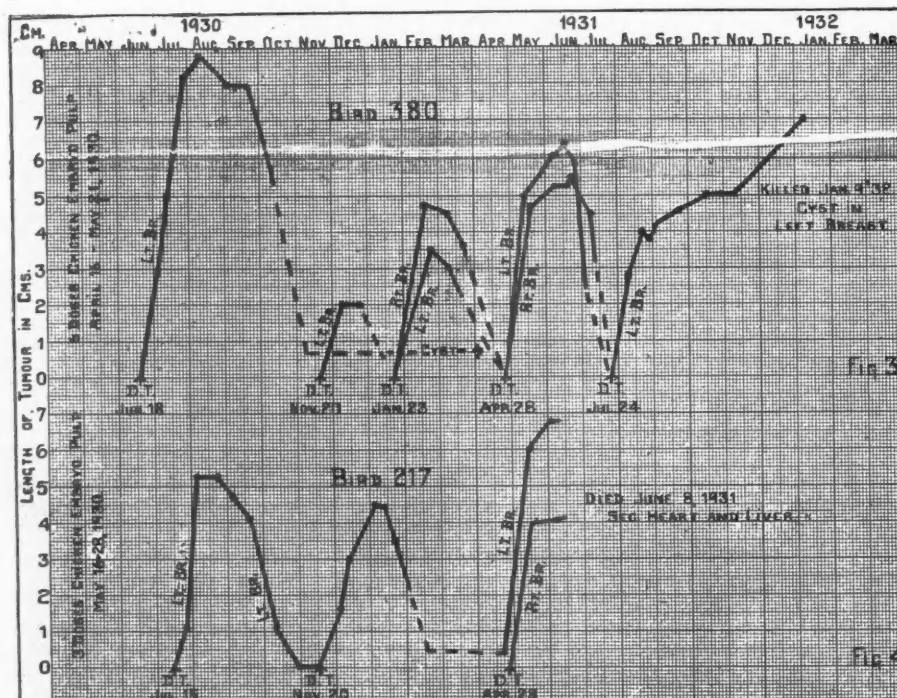
BIRD 380

1930.—Received 1 c.c. embryo pulp in right breast April 16, April 23, April 30, May 8, May 16 and May 21.

June 18.—Transplanted in left breast, with 2 birds which had received similar treatment and 3 normal controls.



T.E.: Tumour extract. D.T.: Direct transplant.



T.E.: Tumour extract. D.T.: Direct transplant.

Treated birds—No. 379 died of tumour in 31 days; 381 died of tumour in 26 days.

Norman controls—No. 2937 died of tumour in 21 days; 2938 died of tumour in 21 days; 2939 died of tumour in 19 days.

June 26.—Nodule.

July 4.—Tumour, 2.5 x 3.2 cm.

July 9.—Tumour, 3.5 x 5.0 cm.

July 18.—Bird in fair condition; tumour, 5.8 x 6.2 cm., heaped, blue and soft.

July 30.—8.4 x 6.4 cm.

August 13.—8.8 x 5.4 cm.; chicken in good condition.

September 4.—4.7 x 8.0 cm., hard, freely moveable.

September 19.—3.4 x 8.0 cm.

October 10.—Tumour, nodular.

October 25.—Three nodules, skin blue in colour.

October 31.—Tiny nodules in breast; tumour walled off to form cyst.

November 5.—Nodules almost disappeared; cyst soft and moveable.

November 19.—20 c.c. blood drawn for serum test.

November 20.—Retransplanted in left breast with 3 controls, 2 of which died of tumour in 32 and 15 days and 1 was killed for tissue in 15 days.

December 2.—Tiny nodules in breast.

December 12.—Tumour, 1.7 x 2.0 cm.

December 22.—Tumour not growing.

December 29.—Tiny nodules; cyst smaller.

January 23, 1931.—Transplanted twice in each breast, with 3 controls which died of tumour in 31, 31 and 24 days.

January 30.—Old nodules and cyst present.

February 26.—Left tumour, 2.5 x 3.5 cm.; right tumour, 3.4 x 4.7 cm.

March 5.—Left, 2.1 x 3.3 cm.; right, 4.1 x 4.5 cm., heaped, nodular and hard.

March 18.—Left tumour, 6 x 2.3 cm., and 3 nodules, right, 3.5 x 3.7 cm.; nodular.

April 1.—Nodules in both breasts; right side hard.

April 28.—Transplanted on both sides, with 3 controls, 1 of which died of tumour in 20 days and 2 were killed for tumour tissue in 14 and 17 days.

May 15.—Left tumour, 4.0 x 5.0, hard; right, 3.5 x 4.7, heaped.

June 3.—Left, 6.0 x 6.0 cm., not heaped; right, 3.8 x 5.3 cm., heaped; bird in good condition.

June 16.—Left, 6.0 x 6.4 cm.; right, 4.0 x 5.4 cm., heaped and hard.

July 24.—Left, 4.0 x 5.8 cm., hard; right, 3.8 x 5.5 cm.

July 2.—Left, tumour flat, 1.0 x 2.5 cm.; old cyst present; right, 2.8 x 4.0 cm. Tumour is very narrow and flattened; surrounding muscle soft; tumour separating from muscle; small cyst about 2 cm. in length; bird in poor condition, but crop full.

July 8.—Left side, tumour disappeared; cyst remains; right, subcutaneous cyst; muscle below, hard.

July 23.—Left, scattered small nodules and cyst; right, cyst 3.5 x 2.4 cm., moveable; bird's condition improved.

July 24.—Transplanted on left side, with 3 controls, 2 of which died in 17 and 18 days, and 1 was killed for tumour tissue in 14 days.

July 31.—Tumour not developing.

August 10.—Left tumour, 2.7 x 2.7 cm.

August 18.—Left tumour, 3.3 x 4.0 cm., low and spreading.

August 24.—Left, 3.4 x 3.7 cm., appears to be separating from muscle.

September 2.—Left, 4.0 x 4.3 cm.

September 24.—3.6 x 4.6 cm.

October 20.—5.0 x 5.0 cm.

October 27.—Left, 4.5 x 4.9 cm.

November 9.—4.6 x 5.0 cm.

January 9, 1932.—Bird very thin; left tumour, 5.7 x 6.9, heaped and hard.

Bird killed; old subcutaneous cyst remained in left breast; no secondaries.

Fig. 3 represents the tumours which occurred in bird 380 following five direct transplants. The size of the tumours is represented on the chart by their longest measurement in centimetres. Fig. 4 represents the tumours which occurred following three transplants in bird 217. The tumour which developed from the transplant in the left breast on November 20, 1930, had not completely disappeared on April 28, 1931, at which time the bird received a transplant in the right breast only. The nodule in the left breast then took on a rapid growth and had attained a large size when the bird died on June 8, 1931.

From the fact that of 140 birds treated with embryo pulp 3 became resistant and 2 showed partial resistance, it might be considered that the embryo pulp had had some effect. However, since resistant birds occurred in other experiments in which repeated injections of various substances were given, it seemed reasonable to conclude that embryo pulp had no specific quality which aided the birds in developing resistance.

Up to the present all resistant birds which have occurred in this laboratory developed a tumour which subsequently regressed. If the embryo pulp had produced a specific resistance to Rous sarcoma, the pulp-treated birds should not have developed a tumour following their first tumour inoculation. Since this was not the case, the resistance which the three birds showed must have been produced, as in the case of other resistant birds, by the regression of their tumour. Regression of a tumour does not always produce complete resistance. In birds 380 and 217 of this experiment only partial resistance was produced following the regression of a tumour.

The most likely explanation of the fact that the regression of a tumour produces complete resistance in some birds and partial resistance in others is that there is a variation in the degree and duration of resistance developed by the regression of a tumour. The mechanism by which a chicken causes the regression of a growing tumour is unknown, but a number of experiments are being carried out in the endeavour to throw some light on this problem.

THE TREATMENT OF RINGWORM OF THE SCALP BY THALLIUM ACETATE AND THE DETECTION OF CARRIERS BY THE FLUORESCENCE TEST*

By A. M. DAVIDSON, M.B., Ch.B.(EDIN.), M.D. (MAN.),† P. H. GREGORY, B.Sc., Ph.D.(LOND.),‡
AND A. R. BIRT, M.D.(MAN.).§

Winnipeg

IN 1932 an outbreak of ringworm of the scalp occurred in a Winnipeg orphanage. On account of the large number of patients who required treatment simultaneously, it was decided to use the thallium acetate method of epilation in preference to the time-consuming treatment by x-ray. An opportunity was thus presented to study the progress of cure by the fluorescence test. The fluorescence test depends on the fact that hairs infected by microsporon show green fluorescence when examined with filtered ultra-violet light (Wood's light) in a darkened room. As a rule hairs from cases of favus also fluoresce green. In addition to the patients from the orphanage, nine other children suffering from ringworm of the scalp required treatment. In all, thirty-eight patients with ringworm of the scalp due to microsporon were treated with thallium acetate. The ages of the children ranged from two and one-half to twelve years. They were treated through the out-patient department of the Winnipeg Children's Hospital, but all were admitted to hospital for the administration of the drug.

DIAGNOSIS

The diagnosis of ringworm of the scalp due to microsporon was always based on the following tests: (1) clinical examination; (2) the fluorescence test; and (3) microscopical examination of hairs. The species of microsporon present was identified culturally in the majority of cases. All the patients examined were questioned regarding the probable source of infection, both human and animal. Whenever possible the source was ferreted out and all other contacts were examined. The children were first submitted to a careful clinical examination and a

positive or negative result recorded. Then the children were examined with the fluorescence lamp, whether they showed clinical evidence of infection or not. Hairs were removed from all patients with suggestive gross signs or with fluorescent green hairs, and examined microscopically. In all 170 patients and contacts were examined. The results of this examination are shown in Table I.

TABLE I
Examination of 170 patients and contacts
for ringworm of the scalp.

Clinical examination		Fluorescence test	
170 patients	positive 31	positive	31
		negative	0
	negative 139	positive	7
		negative	132

The finding of fluorescent hairs on seven patients who were clinically passed as negative is the outstanding feature of this examination. The unsuspected fluorescent hairs varied in number from one to five or six on a scalp, and microscopic and cultural tests confirmed the presence of microsporon infection in all cases. This observation and some recent work done with kittens¹ throws new light on the epidemiology of ringworm of the scalp and suggests the possibility of human carriers of the disease. We shall discuss this question later.

As shown in Table II, thirty-six of the thirty-eight patients treated were boys, and twenty-nine

TABLE II

Outbreaks	Species of microsporon	Number of patients	Sex
1.	<i>M. audouini</i>	29	Male
2.	<i>M. audouini</i>	1	Male
3.	<i>M. audouini</i>	2	Male
4.	<i>M. audouini</i>	1	Male
5.	<i>M. audouini</i>	1	Male
6.	<i>M. audouini</i>	1	Male
7.	<i>M. audouini</i>	1	Male
8.	<i>M. felineum</i>	2	Female
Total		38	

* This work was made possible by a grant from the Banting Research Foundation, Toronto.

† Lecturer in Dermatology, University of Manitoba.

‡ Research Worker on Dermatophytes, University of Manitoba, Winnipeg.

§ Assistant Dermatologist, Winnipeg Children's Hospital.

of these were in one orphanage. The boys were all infected by *Microsporon audouini*. The two girls, who were sisters and had been in contact with a diseased kitten, were infected with *M. felineum*.

METHOD OF TREATMENT

The procedure adopted for the administration of thallium acetate was based on that advocated by Ingram.² The patients were admitted to the hospital and weighed nude twice a day for two days. Each child was submitted to a thorough physical examination, including a complete urinalysis. The dose of thallium acetate in milligrams was calculated by multiplying the lowest recorded weight of the child in pounds by four. The drug, a heavy white crystalline powder, demands special care in preparation for the patient. The dose was always weighed twice, placed in a vial and accurately labelled. At the time of administration it was dissolved in a little sweetened water, great care being taken to get the last trace into solution. The amount of water used is of some importance. Usually half a cup was sufficient, the amount being diminished for smaller children. Often a great deal of tact was required to ensure that the child took and retained the entire amount. If this is not accomplished the method has failed at the outset. In order to avoid treating children approaching puberty, those over twelve years of age or whose dose would have amounted to more than 300 mg. were not treated. After the administration of the drug the child was kept in bed at rest for twenty-four hours. The head was shaved and painting the entire scalp three times a day with Tincture of Iodine (B.P.) was commenced. After three days in hospital, the children were discharged, wearing cotton caps. Each child was provided with two caps, thus ensuring a clean cap daily. Two weeks after the administration of the drug, washing the head twice a week with spirits of green soap was added to the routine.

After discharge from the hospital the children returned periodically to the out-patient department for further observation. Their heads were carefully watched to note when the hair began to fall, the first sign of which was often found by searching the inside of the cotton caps. This clinical examination was always supplemented by the fluorescence test. The patients in the orphanage were in charge of a graduate nurse, who, with the aid of the fluorescence lamp

previously described,³ was able to keep very reliable records of the progress made during treatment. As will be seen in Table III, the number of days which elapsed between administration of the drug and the beginning of defluvium varied considerably, the average being thirteen days.

TABLE III
INTERVALS BETWEEN ADMINISTRATION OF DRUG,
DEFLUVIUM, AND REGROWTH OF HAIR

	No. of days to commencement of defluvium	No. of days to completion of defluvium	No. of days to commencement of regrowth
Minimum	9	19	16
Average	13	24	25
Maximum	16	34	32

It was a much more difficult task to ascertain when defluvium was complete and when regrowth of hair had commenced. Thallium acetate epilation, unlike x-ray epilation, does not result in a total temporary alopecia that lasts for any considerable length of time. Usually new hairs began to appear before all the old hairs had been shed. Twenty-one of our cases presented this difficulty. Thus a degree of uncertainty must necessarily enter into any data

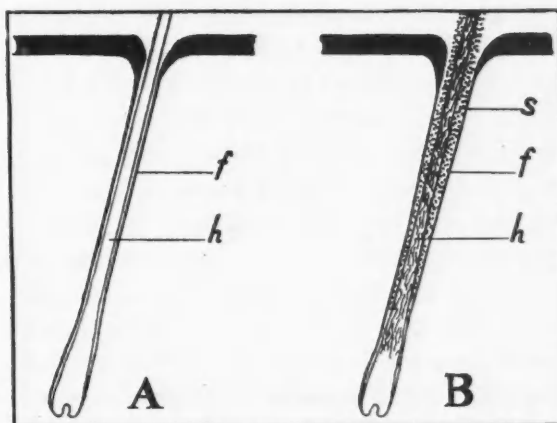


FIG. 1.—A, diagram of a longitudinal section of normal hair (*h*) surrounded by hair-follicle (*f*). B, hair infected by microsporon, showing follicle distended by spore sheath (*s*).

gathered concerning the exact dates of new hair growth and complete depilation. In the present series of cases an average of twenty-four days was required for complete defluvium, while the average time taken for reappearance of the hair was twenty-five days (see Table III). However, as previously noted, more than half of the patients showed evidence of new hair growth before the last of the old hair had been shed. In some cases regrowth was observed as early as three days prior to complete depilation. Shanks⁴

has mentioned this as a great disadvantage of the thallium acetate method of treating ringworm of the scalp. It has also been noted by us, as by many others, that the infected hairs fell much later than normal ones.

It seems probable that the enlarged hair, due to the surrounding sheath of fungal spores, has too great a diameter to be easily shed (Fig. 1). It is possible, therefore, that the retention of the hair is mechanical. These hairs could always be removed manually with less force and pain than normal ones. Obviously, the retention of infected hairs and the early reappearance of new hair form a difficult combination to overcome therapeutically. If great diligence is not exercised in treatment the new hairs will become infected and act as a fresh focus for the disease. Two means were used to overcome these conditions: (1) particular attention was paid to the application of the tincture of iodine; and (2) when defluvium was nearly completed adhesive tape was applied to the scalp in the form of a cap, to remove the remaining hair.

WHAT IS AN ADEQUATE STANDARD OF CURE FOR RINGWORM OF THE SCALP?

A fairly comprehensive review of the literature leads one to believe that up to the present a clinical cure has been the answer usually given to this question. Ingram, whose method we have followed, continues the treatment for nine to eleven weeks after administration of the drug. At the end of this time treatment is stopped. This standard appears to have been accepted by the majority of other writers. More recently Dowling,⁵ Roxburgh,⁶ Shanks,⁷ and others have suggested the possible use of the fluorescence test in estimating cures in cases of ringworm of the scalp. Our own series of cases followed by this means has yielded some very interesting information. As will be seen in Table IV, twenty-eight patients were judged to be cured according to clinical standards within the limit of eleven weeks after administration of the drug, as suggested by Ingram, but only eighteen of them were negative to the fluorescence test at the end of that time. In no case did the clinical picture remain positive longer than the fluorescence test. Three other patients were clinically cured within six months after epilation, yet when examined with the fluorescence lamp they were found to retain scattered fluorescent hairs for as long as six months after becoming clinically

negative. Further, these were retained in spite of continued treatment with green soap and iodine, combined with the manual removal of as many infected hairs as possible under the light of the fluorescence lamp.

Five patients still remained uncured after treatment for a year, being positive to clinical and microscopical examination and to the fluorescence test. They were subsequently cured by x-ray epilation.

TABLE IV

<i>Time after administration of the drug</i>	<i>No. of patients still positive to clinical examination</i>	<i>No. of patients still positive to fluorescence test</i>
0 months	36	36
2 months	8	26
3 months	8	18
5 months	8	8
6 months	5	8
12 months	5	5

NOTE. Two patients were omitted from the Table, as they left the city before completion of treatment.

The persistence of infected hairs on the scalp of patients for so long as twelve months after the administration of thallium acetate, and the existence of possible human carriers of the ringworm fungus, emphasize the need of a critical standard for the detection of both the presence and absence of ringworm infection of the scalp. It is suggested that the three tests mentioned above under the heading of DIAGNOSIS form a diagnostic triad which fulfills, at least partially, this necessity. To facilitate discussion, the members of this triad are again enumerated: (1) clinical examination; (2) fluorescence test; (3) microscopical examination of hairs. Each of the three tests has certain limitations in the diagnosis of ringworm of the scalp which makes the application of the other tests desirable. The limitations of each are dealt with in the following paragraphs.

Clinical examination.—Typical cases of the various types of ringworm of the scalp can be diagnosed with complete confidence by examination of the scalp with a hand lens, or even with the naked eye. Atypical cases demand confirmation by the fluorescence test or by microscopical examination. Clinical examination also has been found inadequate to diagnose the presence of infection in the following atypical conditions: (1) carriers, where no ringworm lesions are present and the few isolated infected hairs on the scalp would not have been discovered among the normal hairs by ordinary clinical examination;

(2) patients after treatment by thallium acetate epilation who present a condition resembling that of ringworm carriers.

Fluorescence test.—The fluorescence test may fail to diagnose the presence of infection under the following conditions: (1) when infection is due not to microsporon, but to species of trichophyton the green fluorescence in ultra-violet light is not observed; (2) when iodine has been applied to the lesion the fluorescence of the hairs is obscured; (3) when oil of cade has been applied and then washed off fluorescent hairs are frequently absent, but reappear after a few days.

Microscopical examination.—The fungus is easily observed, microscopically, when a suitable specimen is examined, but microscopical examination may fail to demonstrate the presence of the fungus when the patient is a carrier with no apparent lesion, unless the hairs to be examined are selected under ultra-violet light.

A study of the limitations of the tests which form the diagnostic triad shows that at least two tests should be adopted as the standard minimum necessary to diagnose the presence of the disease. If any two tests are positive then this infection is present.

The typical clinical picture, when supported by positive microscopical findings, is, of course, definite evidence of disease. If the fluorescence test should be negative, the infection is probably not due to microsporon. If the test be positive a more rapid diagnosis may be made. The bright green fluorescent hairs, when removed, were always found to be microscopically and culturally positive.

A far more important use of the triad is in the absence of typical clinical signs. To diagnose the absence of microsporon infection all these tests must be negative. The importance of fluorescent hairs, which are microscopically and culturally positive for microsporon infection, in a scalp which is apparently healthy can be readily recognized. The discovery of 7 such cases among 139 contacts with ringworm patients tends to emphasize its importance. Whether these children had had definite clinical disease that had spontaneously cured itself, or whether the disease was present without any gross signs is unknown. We have observed fluorescent infected hairs in children whose scalps had been depilated and no longer showed clinical evidence of disease. Similar fluorescent hairs have been

noted in experimentally infected kittens prior to the appearance of any gross lesions. It therefore seems reasonable to suspect that some children who are clinically cured of ringworm of the scalp, and other children who have been contacts of the disease without showing any clinical evidence of it, may and do act as carriers of this fungus infection, and are therefore a potential danger to the community. The prevalence of ringworm of the scalp will therefore not be greatly reduced until examination of contacts and convalescents with filtered ultra-violet light becomes a routine procedure.

The epilation of the scalps of children by thallium acetate has proved to be very satisfactory in this series of cases. Strict attention was paid to details of treatment, and only one case exhibited mild toxic symptoms, consisting of some pain in the knee-joints, lasting about a week and disappearing with rest in bed. We consider thallium acetate to be a valuable adjunct to the treatment of ringworm of the scalp. It should only be used in types of cases known not to be self-limited, and its use confined to epidemics or centres having no adequate x-ray facilities. The administration of the drug should be under supervision of a physician well versed in its advantages and dangers. Administration of the drug in offices and dispensing in any chance pharmacy is not compatible with sound judgment or sane therapeutics. X-ray epilation under direction of a qualified operator in superficial therapy is still undoubtedly the method of choice, and occasional cases should be sent to centres where this mode of treatment is available (Shanks⁷).

SUMMARY

1. In 1932, thirty-eight patients with microsporon ringworm of the scalp were treated in Winnipeg with thallium acetate, in accordance with the method advocated by Ingram. Thirty-six were infected by *M. audouini* and the other two by *M. felineum*.

2. One hundred and seventy children who either had the disease or had been exposed to it were examined. Seven of these children showed no clinical signs of ringworm of the scalp, and yet had bright green fluorescent hairs under Wood's light. This, and other tests, showed them to be infected by microsporon and probably carriers of the disease.

3. Thallium acetate served a useful purpose in

this series of cases; 38 patients were treated; only one had slightly toxic symptoms. Patients were always clinically cured before they ceased to show fluorescent hairs under the fluorescence lamp.

4. It was noted during epilation that infected hairs were retained in the scalp longer than normal ones. It is suggested that this retention is purely mechanical, due to the increase in diameter of the hair surrounded by fungal spores.

5. A triad for the diagnosis of the presence and absence of microsporon ringworm of the

scalp is suggested. Its members are as follows: (1) clinical examination; (2) fluorescence test; and (3) microscopical examination of hairs. The limitations of each test are discussed.

6. It is suggested that the examination of contacts of, and convalescents from, ringworm of the scalp with the fluorescence lamp become a routine procedure.

REFERENCES

1. DAVIDSON AND GREGORY, *Canad. M. Ass. J.*, 1933, 29: 242.
2. INGRAM, *Brit. M. J.*, 1932, 1: 8.
3. DAVIDSON AND GREGORY, *Canad. M. Ass. J.*, 1932, 27: 176.
4. SHANKS, *Brit. J. Dermat.*, 1931, 43: 477.
5. DOWLING, *Brit. M. J.*, 1927, 2: 261.
6. ROXBURGH, *Proc. Roy. Soc. Med.*, 1926-27, 20: 1200.
7. SHANKS, *Brit. J. Radiol.*, 1932, 5: 761.

TWO UNUSUAL CASES OF PRIMARY ANÆMIA*

By EDWARD S. MILLS,

Montreal

THE diagnosis of pernicious anæmia rarely presents any great difficulty where facilities are available for thorough investigation of the case in question. However, the clinician is sooner or later confronted with cases which deviate in certain major respects from the textbook picture of the disease, thus presenting a problem in diagnosis not easily solved.

It is generally admitted that achylia gastrica and macrocytosis or increase in size of the modal erythrocyte are features of such constancy and importance that their combined absence precludes the diagnosis. In fact, they are secondary in importance only to proof that the intrinsic factor in the gastric secretion is lacking, which involves a procedure not always possible even in large clinics. This procedure may be briefly outlined as follows. The intrinsic factor is produced as a result of the action of normal gastric juice on protein such as beef muscle. This interaction takes place *in vitro* as well as *in vivo*. The resulting substance constitutes the anti-anæmic factor in liver and stomach extracts. Its absence or presence in any individual can only be demonstrated by the results of the oral or subcutaneous administration of his gastric contents to another individual suffering from pernicious anæmia. If a satisfactory reticulocyte response follows administration, the factor is present and the patient cannot have true Ad-

disonian anæmia. The following cases are instances in which the diagnosis could not be made with certainty on clinical grounds alone, and a suitable subject for the foregoing experiment was not available at the time. In case 1 the blood picture was that of pernicious anæmia, but with normal gastric acidity. None of the other recognized causes of a hyperchromic anæmia were present. In case 2 the patient was under treatment for hypochromic anæmia seven years before the hyperchromic picture made its appearance.

CASE 1

James McD. (Hosp. No. 4702-33), was admitted to Montreal General Hospital on August 14, 1933, complaining of weakness and dizziness, blurred vision, and swelling of the feet.

Personal history revealed the following important features. He was born in Scotland, worked as a mechanic in a garage, used cigarettes moderately, but never alcohol, or drugs. He never had had venereal disease. In 1916 he was under treatment for an arthritis of left knee, considered, but not proved, to be tuberculous. He continued to have periodic attacks of arthritis in this knee until 1926 when he began to suffer from arthralgia of both feet. Since 1926 the process had involved the back, shoulders and neck as well as the lower extremities. He had had great difficulty in pursuing his occupation as an automobile mechanic because of the pain and stiffness in all his joints.

History of present illness.—About July 7th the joint symptoms became so severe that he was forced to take to his bed, with a generalized arthralgia. In addition to these symptoms he noted weakness, dizziness, and blurring of the right eye. To his knowledge pallor was present only for ten days prior to his admission to the hospital on August 14, 1933. His weight dropped from 143 to 123 lbs. in the three months prior to admission.

Family history.—Irrelevant. His father is alive and well at 58; his mother died at 59 of broncho-pneumonia. He has no brothers or sisters.

* From the department of Medicine, Montreal General Hospital.

Physical examination on admission. Weight, 123 lbs.; height, 5 feet 3 inches; temperature, 99°F.; pulse, 108. He was strikingly pale, with a sallow subicteroid tint to the skin. The hair was black and normal in texture. The tongue was not atrophic. The tonsils were

infected. There was no adenopathy. The lungs were clear; the heart not enlarged, the apex beat appearing 8.5 cm. to the left of the mid-sternal line. There were no murmurs and the blood pressure was 90/50. Neither liver nor spleen was palpable. Examination of the

nervous system revealed no abnormality, except that two-point discrimination over the shins was accurate up to 7 cm. only. Vibration sense was excellent. Both fundi oculi showed retinal hæmorrhages and exudation. In spite of the widespread nature of the arthritic symptoms there appeared little evidence of arthritis on physical examination, except that both feet were very flat.

The laboratory features were as follows.—

1. The urine was normal on ten of thirteen occasions when it was examined.

2. Four stool analyses were negative for blood, pus and ova.

3. The Wassermann reaction was negative, on two occasions.

4. The blood urea, creatinine, and bile pigment were normal. The van den Bergh test showed 0.3 units.

5. The urine urobilinogen was present in 1 to 500 dilution.

6. A barium series and x-ray of the chest were negative.

7. Blood culture was negative.

8. The electrocardiogram was normal.

9. Gastric test meals.

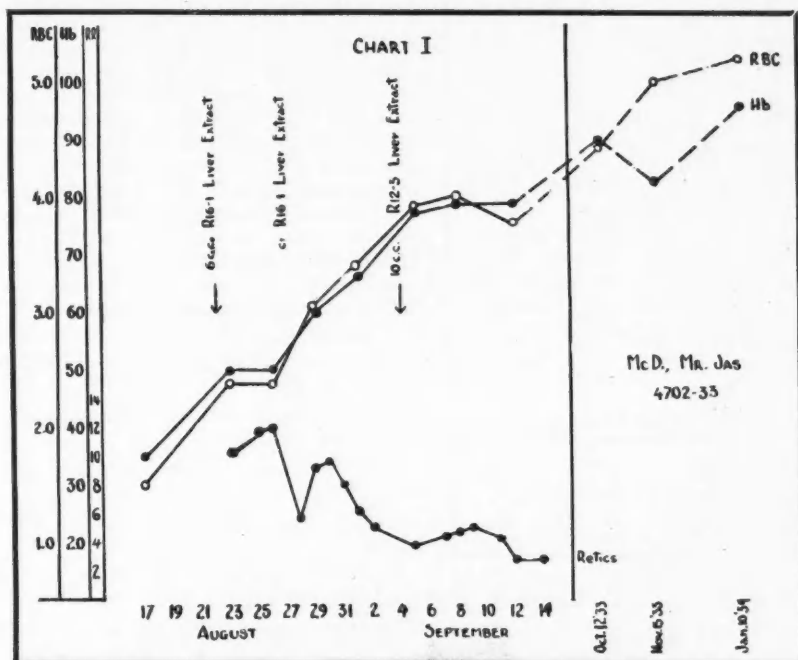
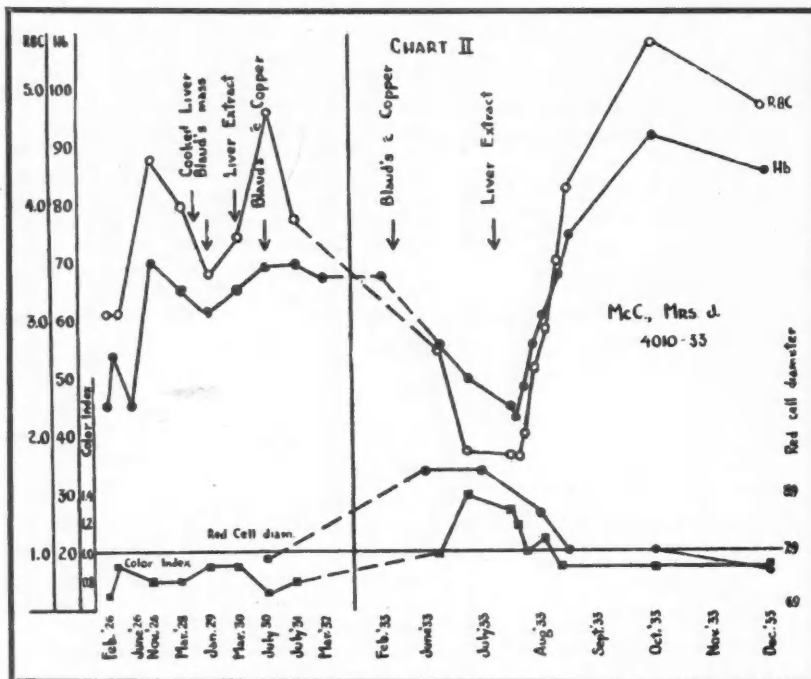


TABLE I.

Date	Red Blood Cells in millions	Hb Per cent	Colour-index	White Blood Cells in thousands	Platelets in thousands	Ret. reds	Red Blood Cells diam.	Differential					Treatment	Remarks
								Pns.	Lympho.	Eosino.	Mono-cytes	Others		
Aug. 17	1.49	35	1.2	6,750	266		8.8	73	18	2	1	Mye. 2 Bas. 2		Many macrocytes
Aug. 21													6 c.c. liver ext. intram.	Fragility of red blood cells, normal
Aug. 23	2.41	50	1.1											
Aug. 24						10.1								
Aug. 25						11.8								
Aug. 26						12.0								
Aug. 28						5.7								
Aug. 29	3.22	61	0.9			9.2	8.0						6 c.c. liver ext. (27th)	
Aug. 30						9.6								
Aug. 31						8.0								
Sept. 1	3.47	66	0.9			6.1								
Sept. 2						5.0								
Sept. 5						3.8							6 c.c. liver ext. (4th)	
Sept. 7						4.3								
Sept. 8	4.09	79	0.9			4.9								
Sept. 9						5.1								
Sept. 11						4.4								
Sept. 12	3.80	79	1.1			2.9	8.4							
Sept. 14						3.0	8.2	55	21	19	2	Metamy. 1 Myeloc. 1		Numerous macrocytes
Oct. 3					325									
Oct. 12	4.46	85	0.9				7.6							
Nov. 15	5.01	78	0.8				7.2							
Jan. 10 1934	5.23	96	0.9				7.6							



	August 16th		August 21st	
	Free HCL	Total acidity	Free HCL	Total acidity
Fasting	0	17	0	13
15 min.	7	17	9	30
30 "	0	46	30	50
45 "	39	76	24	42
60 "	18	79	14	42
Post-histamine 5 mgs.			49	76

At the present time the patient is back at his work. He still suffers from arthritis of both feet, but there is no anæmia.

Table I gives a synopsis of the blood values in this case. Chart 1 is a graphic representation of the apparent response to treatment.

CASE 2

Mrs. John McCallum, aged 31 years (Hosp. No. 9864-25; 835-26; 4010-33), was first admitted to the hospital on February 16, 1926, complaining of weakness and shortness of breath, headaches, poor appetite and numbness of the hands.

The *personal history* revealed influenza and bronchitis in 1918. She had been through two pregnancies. One child is six years old and is in good health. The second died at 9½ months of a gastro-enteritis.

She dated her *present illness* to the time of her puerperium, 10 months before, since which time she had suffered from the following symptoms enumerated in the order of their appearance: weakness and anæmia, anorexia, headaches, sores on the tongue, pains in the back and legs, numbness and tingling of the hands. There was no history of blood loss.

The *family history* was not relevant.

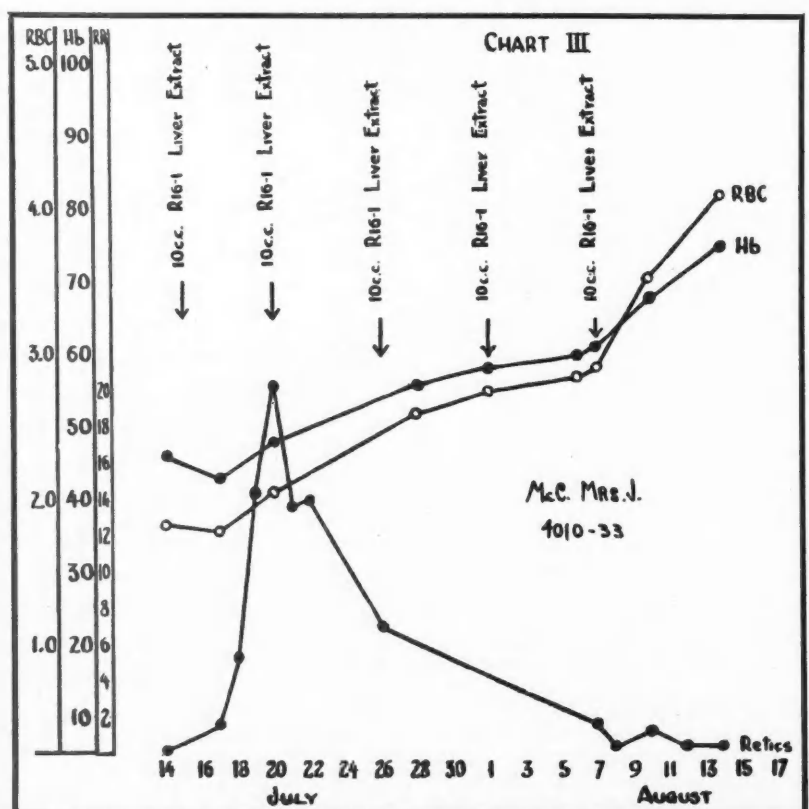
Examination on admission.—Height, 4 feet 7 inches; weight, 112½ lbs.; pulse, 88; respirations, 22. The skin

was not icteroid. There were here and there patches of leucoderma. The sclerae were of a robin's egg blue. The subcutaneous fat was well preserved. The tongue was atrophic. The heart was not enlarged, but a systolic murmur was heard over the precordium, loudest at the pulmonic area. Blood pressure, 95/62. Lungs clear; no adenopathy; spleen just palpable; liver not enlarged. All superficial and deep reflexes were present and normal. Vibration sense over tibiae was estimated at 70 per cent, right side; 50 per cent on left side. Two-point discrimination over the same area was normal.

The following laboratory features were noted.

1. Urine, normal on 7 occasions.
2. Ewald test meal; 30 c.c., recovered in 30 minutes, showed no free HCL and no acidity.
3. The Wassermann test was negative on two occasions.
4. The blood metabolic rate was minus 10.
5. van den Bergh, indirect, was negative twice.
6. Urobilinogen, normal twice.
7. Stool examinations were always negative.
8. X-ray of the long bones and a barium series were negative.

She was discharged unimproved on April 3, 1926, with instructions to take Fowler's solution m. V and Blaud's mass, gr. V, after meals and acid hydrochlor. dil. m. XV, with meals. Following discharge she reported to the out-patient department and was followed until her second admission on July 12, 1933. During this time she had received the following treatment. From January 13, 1927, to December 15, 1927, she took a half pound of cooked liver daily. From December 15,



1927, to March 18, 1930, she was on massive doses of Bland's mass (60 grains daily) and acid hydrochlor. dil. In addition, from January 29, 1929, to March 18, 1930, she took Connaught Liver Extract (equiv. 250 grm.) daily. From March 18, 1930, to the time of her second admission she took Bland's mass, gr. 90, copper sulphate, gr. 1/16, daily. The absence of response to all forms of therapy is recorded in Table II and illustrated by Chart 2 which show the blood values from the beginning of the illness to the present time.

During her second admission from July 12 to August 18, 1933, she presented a train of symptoms identical with those at her first admission. In addition, she had lost weight from 145 to 123 lbs. in a year. There was definite improvement in her physical condition other than the anæmia. The tongue did not now appear atrophic, the spleen was not palpable, and two-point discrimination and vibration sense were normal. The same precordial systolic murmur was present. Achylia gastrica persisted even after a half milligram of histamine. Chart 3 illustrates the reticulocyte response

to intramuscular liver extract during the hyperchromic phase of the disease.

DISCUSSION

The clinical features of Case 1 were not such as to suggest a diagnosis of pernicious anæmia. The history pointed to an arthritis secondary to some low-grade infection. The anæmia was of recent origin and rapid in its onset, though admittedly of grave severity. The patient had not reached a decade where pernicious anæmia was common. He had no obvious subacute combined cord degeneration and no atrophy of the lingual or gastric mucosa. His gastric contents were apparently normal, though the intrinsic factor

TABLE II.

Date	Red Blood Cells in millions	Hb Per cent	Colour-index	White Blood Cells in thousands	Ret. reds	Red Blood Cells diam.	Differential				Treatment	Remarks
							Pns.	Lympho.	Eosino.	Others		
Feb. 16/26	3.11	45	0.7	7.5			56	36	3		HCL, m XV; Fowler's solution	Many microcytes.
Mar. 14/26	3.14	54	0.9	9.5								van den Bergh neg.
June 10/26		45										
Nov. 18/26	4.43	70	0.8									
Jan. 13/27											Liver ½ lb. daily.	
Mar. 1/28	3.99	66	0.8								Liver discontinued.	
Nov. 15/28	3.49	66	0.9	4.8								
Jan. 29/29	3.43	62	0.9	4.0							Connaught liver ext. 250 grm. daily.	
Mar. 18/30	3.78	66	0.9	4.2							Discontinued liver ext.	
July 9/30	4.88	70	0.7	3.0	0.6	7.8	58	40	2		Bland's gr. 90 Cu. SO ₄ , gr., 1/16 daily.	
Aug. 13/30		63										wt. 145¼ lbs.
July 22/31	3.93	70	0.8	2.3								wt. 125 lbs.
Mar. 2/32		68										wt. 126 lbs.
Feb. 15/33		67										wt. 123 lbs.
June 7/33	2.75	56	1.0			9.3						
June 21/33	1.88	50	1.4									
July 14/33	1.82	46	1.3	3.0	0.1	9.3	64	27	2	Mye. 3	10 c.c. liver ext. intram. (15th)	
July 17/33	1.79	43	1.2		1.7							
July 18/33					5.3							
July 19/33					14.3							
July 20/33	2.07	48	1.0		20.2						10 c.c. liver ext. intram. (20th)	
July 21/33					13.7							
July 22/33					14.0							
July 26/33					7.0							
July 28/33	2.60	56	1.0								10 c.c. liver ext. intram. (26th)	
Aug. 7/33	2.92	61	1.1		1.7	8.6					10 c.c. liver ext. intram. (1st)	
Aug. 10/33	3.53	68	0.9		1.4						10 c.c. liver ext. intram. (7th)	
Aug. 14/33	4.16	75	0.9		0.5	7.9						
Oct. 4/33	5.39	92	0.9			7.9						
Oct. 27/33	4.86	86	0.9			7.6						

was not demonstrated. The spleen was not palpable. On the other hand no cause for the anæmia was found. He harboured no parasites, his Wassermann reaction was negative, and there was no history or stigma of lues. The blood picture presented the classical features of Addisonian anæmia. The anæmia was severe in degree, the colour-index was high, and the erythrocytes were considerably above the average in size and in hæmoglobin content. The red-cell diameter, as shown by Table I, was always above the normal until the count returned to normal limits. The leucocyte formula was also in keeping with that diagnosis. Further, the reticulocyte response to intramuscular liver extract was apparently typical of pernicious anæmia. This therapeutic test would seem to clinch the diagnosis. However, when one studies Chart I carefully, certain unusual features become evident. In the first place it will be noted that the rise in blood values is fairly uniform from beginning to end. In other words, definite improvement was noted before the first dose of liver extract was given, and this improvement continued after the extract, whether because or in spite of this treatment can, I think, be inferred from the time of the maximum reticulocyte response. It will be noted that the peak of the reticulocyte curve occurred on the second day after the first dose of the extract was given. Now it has been amply shown that this maximum response occurs invariably from the fourth to the fifth day after the intramuscular injection of a potent liver extract. The case, therefore, is one of hyperchromic anæmia of unknown origin in which normal gastric acidity persists. Acholuric jaundice, aleukæmic leukæmia, syphilis, tape-worm infestation, liver disease, sprue, and other diseases known to produce such an anæmia could be excluded. The case is similar to those cases of pernicious anæmia with normal gastric acidity recently collected and reported by Wilkinson. Nevertheless, until such time as the presence or absence of the intrinsic factor can be established such a diagnosis is hardly justified. It would be of interest to know how many of the reported cases of pernicious anæmia with free hydrochloric acid in their gastric contents would survive this diagnostic ordeal. So far as can be gathered from available literature this procedure has never been reported in such cases.

The second case is in many respects the antithesis of the first. The patient is a young woman

who has been under observation for anæmia for eight years. The anæmia began either during pregnancy or during the post-partum state. Until recently it was invariably of the hypochromic type. During the years of treatment many dozens of blood examinations were made, and always until recently the colour index was low and the modal cell was under the normal size. Further, the bilirubin content of the plasma was within normal limits. It was noted during her first admission that the cells were largely microcytes; macrocytes were not present. In 1930 an actual measurement of the modal red cell gave a reading of 7.8 microns — a figure at or slightly below the normal value. The gastric contents were devoid of free hydrochloric acid and showed very low values for the total acidity. The diagnosis of idiopathic hypochromic anæmia made in 1926 was apparently supported by the course of the disease. In the first place, subacute combined degeneration of the cord never made its appearance. After seven years of continuous anæmia of moderate degree cord degeneration could be demonstrated by any of the recognized clinical tests, though she had dyæsthesia of the hands at the time of her first admission. Pernicious anæmia rarely treats its victims so generously. Perhaps even more convincing was the response to liver therapy. The patient took liver for a prolonged period without any appreciable effect upon the blood values. After the failure of liver, the effect of liver extract of known potency was observed. This, too, proved valueless in appreciably raising the erythrocyte count or the hæmoglobin level, and was discontinued. After the failure of liver and liver extracts she was given massive doses of Bland's mass (60 to 90 grains daily), then Bland's mass with copper (90 grains Bland's with gr. 1/16 of copper sulphate daily) but without signal success. Finally, during the summer of 1933, it was noted that the anæmia was becoming more severe and for the first time the colour-index was high. The red cell diameter, which had been low, now became high. The microcytosis was replaced by a macrocytosis and the anæmia became much more pronounced, assuming the picture of pernicious anæmia (see Chart II). The patient was at once admitted to the wards in order that her reticulocyte response to liver extract might be tested. As Chart III shows, she responded exactly as pernicious anæmia does to intramuscular liver extract, and

now has a normal blood picture. It would seem fair to assume in this instance, therefore, that the case was one of idiopathic hypochromic anæmia with achlorhydria, without loss of the intrinsic factor of pernicious anæmia, but during 1933 this factor was also lost. The blood picture then assumed the character of an Addisonian anæmia. The therapeutic failure of liver and its extract at one time and then success at a later date further support this contention. It is of further interest that the anæmia has again reverted to the hypochromic type, as illustrated by Chart 2, though this change is hardly significant, since most cases of pernicious anæmia when adequately treated by intramuscular liver extract have shown, in our experience, a similar change.

SUMMARY

1. Two unusual cases of anæmia are presented.
2. The first is an instance of hyperchromic anæmia with normal free hydrochloric acid,

similar to reported cases of pernicious anæmia with normal gastric acidity.

3. The second is an instance of idiopathic hypochromic anæmia which failed to respond to liver or its extracts, then later assumed the characters of pernicious anæmia.

CONCLUSIONS

1. Reported cases of pernicious or Addisonian anæmia having apparently normal acidity should be tested for the intrinsic factor said to be lacking in this disease.

2. Idiopathic hypochromic anæmia may later develop into a true Addisonian anæmia.

The author gratefully acknowledges the technical assistance of Miss Eleanor McKinnon, B.Sc. His thanks are also due to Drs. C. P. Howard and A. H. Gordon for permission to publish the cases.

After submitting this paper for publication he found that he had unintentionally omitted to refer to the fact that Beebe and Wintrobe have shown the value of testing for the intrinsic factor in the gastric contents in obscure cases of primary anæmia. (*Arch. Int. Med.*, 1933, 51: 630.)

BIBLIOGRAPHY

1. WILKINSON, J. F., *Quart. J. Med.*, 1932, (N.S.) 1: 361.

THE PROBLEM OF HÆMORRHAGE IN OBSTETRICAL PRACTICE*

By W. B. HENDRY, B.A., M.B.,

Toronto

THE problem of hæmorrhage in pregnancy and childbirth is of extreme importance to both the public and the medical profession; it plays a tragic part in the vital statistics of this continent. Standing, as it does, third in the list of the causes of maternal death it is a constant reproach to the profession and a menace to the natural increase of the population. At least one-half of the deaths from hæmorrhage could be prevented if both expectant mothers and doctors realized its danger and took proper steps to control it. But it seems to be almost impossible to bring home to everybody the significance of uterine hæmorrhage occurring during pregnancy and the necessity of checking it.

For many years it was, and still is, a popular belief that menstruation could and occasionally did occur regularly during pregnancy. However, the work of Allen and Doisey, Aschheim, Zondek, and a host of other biochemists has ex-

ploded that belief, and it is now accepted that any uterine hæmorrhage occurring after pregnancy has been established threatens the stability of the pregnancy and may endanger the life of the fetus and of the mother.

In the first trimester hæmorrhage usually means one of three things—abortion, ectopic gestation, or hydatidiform mole. Of these, the first mentioned is by far the most common, the number of cases admitted to our wards over a ten-year period being more than 12 per cent of the number admitted at term. More than one-third of these abortions were admittedly self-induced. One of the most pernicious and futile methods of induction was the introduction of potassium permanganate tablets presumably into the cervical canal, but generally into the vagina, a practice which produces punched-out ulcers at the point of contact and causes alarming hæmorrhage, without accomplishing the desired result.

In cases of threatened abortion, as evidenced by slight or moderate hæmorrhage through an

* Read before the Section of Obstetrics and Gynaecology, Academy of Medicine, Toronto, November 16, 1933.

undilated cervix, with or without irregular pains, our treatment is rest in bed, and the administration of sedatives as required, together with a small daily enema, the patient being kept in bed for a week after the hæmorrhage has stopped. We do not follow the British practice of giving small doses of ergot in these cases. When abortion is inevitable, that is, where the pains are regular and strong, the cervix dilated and the ovum presenting, we pack the cervix and vagina tightly with gauze and give five grains of quinine and three grains of ergotine every four hours for twenty-four hours. When the gauze is removed at the end of that time the ovum usually accompanies it.

If the abortion is incomplete on admission to hospital, in the absence of fever, we empty the uterus under gas-oxygen anæsthesia, swab out the uterine cavity with iodine, and pack it lightly with gauze for twenty-four hours. In the presence of fever we treat the patient conservatively, examine a cervical smear, and take a blood culture. Our only indications for emptying the uterus are severe hæmorrhage and the presence of secundines which interfere with proper uterine drainage. When curettage is considered necessary precautions are taken to avoid breaking down nature's leucocytic barrier against infection. Here again the uterus is swabbed out with iodine and packed lightly with gauze for twenty-four hours.

Ectopic gestation occurs much less frequently than abortion and in hospital practice forms about 1 per cent of the pregnancies admitted to the wards. Its diagnosis is not always easy, the percentage of error in most clinics ranging from 15 to 30 per cent. The classical type is not hard to diagnose, with or without its history of amenorrhœa of one or two months' duration, and then sudden, severe pain in the right or left lower quadrant, accompanied by slight uterine bleeding, and presenting on examination a tender mass behind or to one side of the uterus. Nor does the cataclysmic type, with its sudden, severe abdominal pain and collapse offer any difficulty. But in 5 per cent of all cases there is no history of amenorrhœa, and in more than 5 per cent there is no vaginal bleeding. In over 20 per cent of all cases the hæmorrhage is not dark brown but red in colour, and in over 30 per cent the history and symptoms are identical with those of threatened abortion, while in over 10 per cent the patient

complains of pain referred to other locations than the lower abdomen.

So great is the variation in the character, degree and location of the pain in the presence of ectopic gestation, that whenever an acute abdominal condition is seen in a female between puberty and the climacteric ectopic gestation must be considered before making a diagnosis. Then, too, in our experience almost all cases, except the cataclysmic type, have an elevation of temperature of from one to four degrees Fahrenheit, and almost all show a leucocytosis, the leucocyte count increasing in proportion to the amount of free blood in the peritoneal cavity.

It will, therefore, be readily understood that the diagnosis is not easy, and that a complete history and a careful bimanual examination are necessary to arrive at the correct one. When in doubt a posterior colpotomy may be done, and when blood is found in the pouch of Douglas the diagnosis may be considered confirmed. Once the presence of an extra-uterine pregnancy is recognized operation is imperative, as the ovum that nests in the wall of a tube is a constant and imminent danger to the life of the mother.

Hydatidiform or vesicular mole must be considered as a dangerous condition because of its association with chorio-carcinoma, about 40 per cent of the latter giving a history of the former. Fortunately it is not common, occurring about once in 800 pregnancies in hospital practice. Vesicular degeneration of the chorionic villi commences early in pregnancy, and the uterus enlarges rapidly until by the third month the fundus reaches almost to the umbilicus and can be felt as a smooth, rounded, resilient mass in which no fetal parts or movements can be felt. The Zondek-Aschheim test for pregnancy is positive and the symptoms of nausea and vomiting are usually exaggerated until uterine bleeding occurs, after which they subside to a marked degree. The blood is bright red in colour and usually moderate in amount, and when the characteristic vesicles appear in the blood clots the diagnosis is complete. The uterus should then be emptied and carefully curetted in order that no degenerated villi may be left behind. It should then be swabbed with iodine and packed with iodoform gauze for twenty-four hours. A Zondek-Aschheim test should be made before the patient leaves the

hospital, and if found to be positive a second curettage should be done, and she should be kept under observation and treatment until the test is found to be negative.

Next for our consideration come placenta ablata, placenta prævia and their handmaiden, post-partum hæmorrhage.

Placenta ablata occurs so often in connection with the late toxæmias and so seldom as the result of injury that it may well be considered a complication of the toxæmias, and must be kept in mind as a possible source of danger when symptoms of pre-eclampsia appear. The hæmorrhage may be revealed or concealed, or both. It may be moderate or severe, the most severe types being usually concealed. It may occur at any time during the last trimester, but is more common in the eighth or ninth months and at term. Its presence at any time in any amount should be regarded with suspicion and appropriate treatment given, as it is always a sign of danger to both mother and child. The amount of hæmorrhage, whether revealed or concealed, is usually in proportion to the extent of placental separation, and is accompanied by irregular, painful uterine contractions, while the uterus itself is tender and in severe cases tense and ligneous, and the patient herself suffers a degree of shock and collapse out of all proportion to the visible hæmorrhage.

In all cases the patient should be put to bed and an attempt made to combat the shock and stop the hæmorrhage. This usually means ultimately emptying the uterus in order to control the hæmorrhage from the placental site. For this purpose various methods have in our experience proved effective. When the hæmorrhage is revealed packing the cervix and vagina tightly with gauze and applying an abdominal binder will sometimes control it and induce labour. Then again labour may be induced by rupture of the membranes, (a) alone, or (b) aided by the hypodermic injection of pituitrin in 0.5 c.c. doses, or (c) combined with the introduction of the hydrostatic bag.

As a rule patients suffering from placenta ablata go into labour very readily, owing to the fact that the partially separated placenta acts as a foreign body and stimulates the uterine muscle to contract, and labour proceeds normally. However, whether the labour is spontaneous or induced, at its completion there is the ever-present danger of post-partum hæmor-

rhage, which the obstetrician must always be prepared to combat. The most dangerous type is that in which the placenta is almost completely detached, the fetus invariably dead, the uterus tense and distended and its walls weakened by the intramuscular extravasation of blood, while the patient herself is in a state of collapse. In this type Cæsarean section or hysterectomy is the treatment of choice and should always be accompanied by intravenous medication and blood transfusion. Where section alone is done the ever-present danger of post-partum hæmorrhage must be kept in mind.

Placenta prævia is diagnosed by the presence of painless uterine bleeding, which is the result of placental separation from the lower uterine segment, brought about by the gradual taking up of the cervix through the rhythmical uterine contractions which occur during the latter half of pregnancy. The diagnosis is not always easy, but as a rule when the placenta occupies the lower uterine segment the presenting part rides higher than usual and does not so readily fit into the brim, while one may feel an abnormal thickness or boggy in one or all of the fornices. When the external os is dilated one may feel the placenta itself or its margin encroaching on the internal os. Radiographic plates taken immediately after the injection of thorotrast into the circulation have been advocated by some as a valuable aid to diagnosis, but in our experience this method has not proved satisfactory, the x-ray diagnosis having been proved to be incorrect in more than 50 per cent of the cases.

When the diagnosis has been made the patient should be kept in bed and under constant observation until the pregnancy is terminated, and in deciding the method of treatment the safety of the mother should be considered before that of the child. Our treatment is by no means uniform in all cases. Many factors have to be considered before deciding on which procedure to follow in the individual case. The age and parity of the patient, the amount of hæmorrhage, the location of the placenta, the condition of the cervix, the presentation and lie of the child, the presence or absence of disproportion, and the stage of pregnancy or labour must all be taken into account. In all cases in which hæmorrhage has occurred before the onset of labour the cervix and vagina should be packed with gauze, and in primigravidæ with a

central placenta prævia a Cæsarean section should be done.

When labour has started and the cervix is partially dilated three methods are available: first, rupture of the membranes to hasten the descent of the head; secondly, rupture of the membranes and introduction of a hydrostatic bag; thirdly, rupture of the membranes and podalic version, in which case a leg is pulled down and a weight attached. These three methods are used for the purpose of supplying a plug to control the hæmorrhage and may be supplemented by the intramuscular injection of pituitrin in 0.5 c.c. doses to stimulate uterine contraction.

When labour has advanced to the second stage it may be allowed to proceed normally if the patient's condition warrants it, or may be assisted when rapid delivery is indicated. As a rule, however, when the bleeding is controlled by the version or the bag it is advisable to give the patient time to recover from her loss of blood and not to hurry the delivery.

Usually the delivery of the placenta rapidly follows that of the child, and may itself be followed by post-partum hæmorrhage of varying degrees of severity. It is advisable, therefore, to give the patient one-half c.c. of pituitrin on the completion of the second stage and one c.c. of aseptic ergot on the completion of the third stage. It is also advisable to have ready a hot intra-uterine douche at a temperature of not more than 120° F. in the event of excessive bleeding.

All patients should be kept under constant observation for at least an hour after the completion of the third stage, during which time the height of the fundus, the degree of uterine contraction, the quality and rate of the pulse, and the amount of the lochia should be noted. When the loss of blood has been either excessive or sudden and the patient is in shock intravenous medication of normal saline, glucose, gum acacia or blood is indicated, and when post-partum hæmorrhage occurs the uterus should be massaged and compressed, a hot intra-uterine douche should be given, and if necessary the uterus packed with gauze. In all cases constant and intelligent post-partum supervision is absolutely necessary for at least forty-eight hours, and a minimum lying-in period of two weeks is advisable, during which time reduced iron in five grain doses after meals is of great value.

In conclusion, and speaking generally, one may safely say that many of the tragedies of pregnancy due to hæmorrhage might be avoided by careful prenatal supervision. But one may also truthfully say that while prenatal care is both advisable and necessary, the blood and bones of obstetric practice consist of skill and judgment in the conduct of labour. The ability to recognize the danger signals and the knowledge to interpret their significance, combined with the courage and intelligence to interfere when interference is necessary will save many lives.

SEVERE GRANULOPENIA FOLLOWING THE USE OF BARBITURATES AND AMIDOPYRINE.—C. L. Randall reports a case of severe granulopenia following the use of barbiturates and amidopyrine and emphasizes the point that granulopenia should not be regarded as a primary type of blood dyscrasia until all possible etiological factors have been eliminated. An apparent increase in the occurrence of granulopenia may be related to the widespread use of drugs containing a benzene derivative. His patient, a woman, aged 25, developed an acute and alarming leukopenia following the use of barbiturates and amidopyrine for the relief of a simple headache. The benzene chain contained in both drugs is possibly responsible for the severe reaction and the disappearance of the granulocytes from the blood. A number of similar cases have been reported recently. A difference may be expected in the reaction to benzene quickly absorbed from the alimentary tract, as compared to the type of benzene poisoning that may result from the prolonged, slow absorption that occurs in industrial exposure. Individuals are known to vary greatly in their susceptibility to benzene. Granulopenia following the use of barbiturates

and amidopyrine may therefore occur only in those persons who are unusually susceptible to the benzene chain.—*J. Am. M. Ass.*, 1934, **102**: 1137.

ACQUIRED SENSITIZATION TO SODIUM ISOAMYLETHYL-BARBITURATE (SODIUM AMYTAL), AS EVIDENCED BY CUTANEOUS ERUPTIONS.—M. Langenbach, St. Louis, reports 4 cases in which a sensitivity to sodium isoamylethylbarbiturate developed as evidenced by skin eruptions. These eruptions were distributed chiefly on the face, neck, arms, hands and mucous membranes of the lips and mouth. None of the cases cited showed any sensitivity to the drug when it was first administered. The sensitivity developed during a period of from eight to fourteen months after the drug had been taken and then discontinued. The primary use of the drug ranged from nine months to two years. The average 3 grain (0.2 gm.) dose was never exceeded in three cases; 12 grains (0.8 gm.) was used in one case during a period of eight hours. This sensitivity differs from that previously noted in that it does not extend to other barbiturates.—*J. Am. M. Ass.*, 1934, **102**: 1376.

ENDOTRACHEAL ANÆSTHESIA IN SURGERY OF THE HEAD AND NECK*

BY RALPH HARGRAVE, M.B.,

Toronto

THE historical development of endotracheal anæsthesia has been very extensively covered by Ralph Waters and his associates in their paper in *Current Researches in Anæsthesia & Analgesia*, 1933, 12: 196. They point out three reasons why this type of anæsthesia was initiated: (1) for the treatment of respiratory obstruction and resuscitation by artificial respiration; (2) for the protection of the tracheo-bronchial tree from contamination during surgical operations on the mouth and nose; (3) for the control of intrapulmonary pressure in thoracic surgery.

James Curry's laryngeal tube is said to have been well known in 1791, and Fine, of Geneva, in 1800, devised a leather laryngeal tube which he introduced through the nares. Laryngeal intubation was common in 1829. Friedrich Trendelenburg, an assistant in Langenbeck's clinic, in 1869 devised an apparatus which first made endotracheal anæsthesia possible. O'Dwyer perfected the intubation treatment of laryngeal diphtheria in 1880. The greatest impetus toward endotracheal anæsthesia and its practical use came from the work of Meltzer, Auer and Elsberg in 1909. Elsberg's apparatus was used at that time.

It is the object of this paper to give a summary of the work and experience which we have had with this type of anæsthesia in surgery of the head and neck during the after-war period. We first adopted endotracheal anæsthesia in 1919 for our plastic work on disfiguring war disabilities of the face and head. At that time, we felt that it offered a distinct advantage over the rectal oil-ether anæsthesia which had been used up to that time. Dr. C. H. Robson, who had considerable experience with endotracheal anæsthesia in England during the war, was a serious advocate of this type of anæsthesia. Its advantages were, first, that it allowed the anæsthetist to control the depth of anæsthesia at some distance from the patient's head, thus being out of

the way of the surgeon; secondly, it gave a very even anæsthetic, with quiet respiration; thirdly, the respiratory airway could not be obstructed by blood or mucus in the pharynx; fourthly, the patient recovered with much less vomiting and distress. At this time the insufflation method of endotracheal anæsthesia was developed, and we had not endeavoured to use the inhalation method which is rapidly becoming popular now.

The insufflation method consists of discharging air and ether vapour into the lungs or trachea under positive pressure. This positive pressure apparently assists in the act of inspiration and is delivered into the lungs with a gum-elastic catheter which should not occupy more than two-thirds of the capacity of the trachea, allowing expired air to pass out around it. The machines which we originally used, and still use to a certain extent, have safety valves on them, which, when set, do not allow the pressure to exceed 30 m.m. of mercury. But we have found that if your catheter is of the proper size it is impossible to damage the lungs by too great a pressure, as the excess will naturally escape out through the larynx, and unless this avenue of escape is blocked there is no danger of damage unless the pressure is very suddenly applied.

The machine which has been a favourite has been the Connell apparatus, although Dr. Robson has made a splendid one after his own ideas which is also popular. Now with "air-insufflation endotracheal anæsthesia" it is very important that the expiratory passage from the trachea to the mouth and outside should be at all times patent, so when surgery is being attempted in the mouth, one needs particularly to be on the watch that the surgeon does not push down the base of the tongue, or that the packing be too tight in the pharynx, thus shutting off the expiratory air. In surgery around or in the nose, it is sometimes rather annoying for the surgeon to have the expiratory air which often contains mucus and blood blown up through the nasopharynx and nasal passage, and a simple method of overcoming this is to insert a Connell metal airway, which side-tracks the respiratory air out

* Read before the Section of Anæsthesia, Academy of Medicine, Toronto, November 27, 1933.

through the mouth. This metal tube with the distal flange cut off has been very satisfactory.

In 1925 and 1926 the inhalation method of endotracheal anaesthesia was evolved, and has not only proved of distinct advantage with endotracheal anaesthesia but is the only method by which we can administer nitrous oxide or ethylene endotracheally. It consists in inserting a large catheter or tube into the trachea, which fits the trachea tightly, so that the patient breathes to and fro within the airway. This large tube is attached to a gas-oxygen apparatus or to certain types of ether apparatuses, and the anaesthetic is conducted into the patient's lungs by the movements of respiration. This method allows the surgeon to pack off the pharynx and he is able to disregard the anaesthesia aspect of the operation, knowing that it is impossible for him to interfere with respiration. Also, the blood cannot get into the larynx between respirations and be blown out with mucus into the field of operation. With this type of anaesthesia it is necessary of course to insert an expiratory valve at some point in the airway distant to the mouth. This method is greatly favoured for anaesthesia with nitrous oxide or ethylene, and was really introduced for these anaesthetic agents. When the anaesthetist attempted to use nitrous oxide by the insufflation method, this was found impracticable as it caused great waste of nitrous oxide and very unsatisfactory anaesthesia.

Endotracheal catheters and tubes.—In the insufflation method of endotracheal anaesthesia we find that gum elastic catheters of sizes 22, 24 and 26 French, for men, and 20, 22 and 24 French, for women, and size 18 for children between the ages of 10 and 14, down to size 12 for very young children and infants, are best. The catheters and tubes used in the inhalation method in endotracheal anaesthesia are numerous and being improved upon all the time. We have Magill's rubber catheters, which consist of three sizes of curved rubber tubing which is bevelled at one end; this is introduced through the nares, and down through the naso-pharynx, pharynx, and into the larynx. Then there is Flagg's metal tube of three different sizes, composed of spiral wire covered with penrose rubber tubing, which makes it flexible from the base of the tube to the mouth, and joined to a straight metal piece which fits into the trachea. Then there is Hargrave's silver wire woven catheter, sizes 30 to 38, which has an olive tip allowing easy introduc-

tion. Also there is Water's improved catheter which consists of an inflatable cuff about an inch and one-half from the tip of the catheter, which can be inflated to fill the larynx completely. With these tubes it is necessary to have a respiratory valve that is connected up to the gas-oxygen apparatus or other types of closed ether apparatus. Flagg recommends a rubber tube be attached to the opening in a tin of ether in which holes have been punched in the top.

TECHNIQUE

Pre-operative sedative.—When using the insufflation endotracheal method it is not necessary to give large doses of drugs before operation, or any drug at all, except that most sedatives tend to make the induction of anaesthesia very much easier. In our work we like the combination of morphine, atropine, and nembutal, using morphine, grain 1/6 for men, and 1/8 for women, atropine, grain 1/150, and nembutal, grains 11/2, this given 30 minutes before operation. The atropine tends to eliminate a lot of mucus which is present in this type of operation. Nembutal makes it much easier than formerly when using the insufflation method. When one wishes to carry the patient on nitrous oxide or ether we favour the use of a larger pre-operative sedative, H. M. C. No. 1 for a man and H. M. C. No. 2 for a woman, with three grains of nembutal, both given three-quarters of an hour before the operation. We find that in a majority of cases this dose is sufficient to make the patient a very tolerant subject for induction with nitrous oxide and a little ether, in order that one may get a sufficient relaxation to introduce a large catheter or tube. There is the occasional patient in whom we find that it is necessary to use considerable ether before this introduction may be made. Again, if it is absolutely necessary that no ether be given to the patient and we are desirous of carrying the anaesthetic through with nitrous oxide alone, we find that the only certain method is to give intravenous nembutal to the point of anaesthesia, that is, until there is relaxation of the muscles of the jaw and abolition of lid reflexes, or the giving of avertin rectally. With these two drugs we have found that we were able to induce anaesthesia with nitrous oxide and oxygen and introduce the catheter or large tube and carry on a smooth anaesthesia, without the introduction of ether.

Methods of introducing endotracheal catheters

and tubes.—There are various methods for introducing endotracheal catheters or tubes, and we divided them into two classes, the indirect method and direct. When using the indirect method it can again be again divided into two. The first is the laryngeal intubation method with the fingers and the sense of touch, as done when intubating in laryngeal diphtheria. The anæsthetist, after fully anæsthetizing the patient until the jaw muscles are relaxed, inserts the mouth gag and opens the jaw. The anæsthetist stands to the left and facing the patient. The left or right first two fingers are introduced into the mouth over the dorsum of the tongue until the second finger palpates the edge of the epiglottis, thus elevating this structure. One will find that the tubercles of the arytenoids come into contact with the pulp of the second finger. The catheter is introduced into the mouth with the other hand and guided along the palmar surface of the first finger into the trachea. One will immediately get a cough reflex if the catheter is in the trachea, and the to and fro breathing can be heard. This method we have used, particularly when introducing endotracheal catheters into children, but we have found it a very difficult method in adults, possibly because our fingers are too short to reach the epiglottis at the base of the tongue. The second indirect method has been introduced by Magill, of London, in which he introduces the catheter or large rubber tube through the nose. The rubber tube, having a slight curve and a bevelled tip, is passed through the nose into the naso-pharynx over the base of the tongue. The head of the patient remains in a normal position, in which the breathing is free in all the head passages. Magill has had great satisfaction with this method, but others who have attempted it have not been so successful. I believe his success has been so great because he uses cocaine in order to anæsthetize the base of the tongue, the epiglottis and pharynx. Our objections to this method are; first, we found it very difficult to carry out; secondly, we are afraid of injuring the turbinates and causing unnecessary bleeding. Also, some surgeons claim we may introduce septic material from the nose into the trachea. The only time that we have found it necessary to introduce catheters through the nose has been when the jaw was ankylosed and we were unable to get the laryngoscope into the mouth. But it will be found in these cases the fact that the jaw is ankylosed and closed

keeps the base of the tongue forward and the airway clear and an endopharyngeal anæsthetic is almost as smooth and as successful as an endotracheal one. The direct method of introducing catheters or tubes is by means of Jackson's laryngoscope or Flagg's special laryngoscope for introducing laryngeal endotracheal tubes. For general use we like Flagg's instrument because it is of large calibre, has a large opening along the side for the introduction of large tubes, and also has a battery attached, making mechanical difficulties few in number.

The position of the patient.—The patient should be in the dorsal position, the occiput on the same level as the back, the chin elevated, and the head turned left laterally as far as possible. The mouth gag is introduced into the left side, care being taken to have it lying on the molar teeth, as they withstand greater pressure than the incisor teeth. The laryngoscope is introduced into the right corner of the mouth, along the right dorsum of the tongue, until the epiglottis is exposed. The epiglottis is lifted with the tip of the instrument. The arytenoids and vocal cords come into view, and the catheter is introduced from one and one-half inches to two inches beyond the vocal cords. In introducing the laryngoscope one should always aim to exert a lifting pressure on the dorsum of the tongue, so that no leverage will be used upon the teeth. This is the ideal method of laryngeal intubation. Some prefer to extend the head over the end of the table and introduce the laryngoscope in that manner, but we have found it no advantage. We have found some criticism, that we are introducing the laryngoscope down the centre of the dorsum of the tongue and thus are more liable to damage incisor teeth. There are cases in which this has to be resorted to, because, when introducing the laryngoscope into the mouth in the molar region, the angle of the jaw is too narrow to allow the laryngoscope to be passed directly into the larynx; then one has more or less to swing the laryngoscope into the centre line. We sometimes encounter a thick-necked person with a short lower jaw in whom it is difficult to introduce the laryngoscope. In this case we have found it of advantage to take a large pillow and double it and place it under the occiput so that the chin is raised anteriorly and the head lowered a little towards the chest. This will allow one to come down directly on the epiglottis with the laryngoscope. One of

the greatest bugbears of the endotracheal anaesthetist is the presence, particularly in the upper jaw, of bridges and inlays which will break or be damaged with the least pressure. If these are present, one way by which we hope to avoid this damage is to see that the patient is well relaxed before attempting intubation. In children intubation with Jackson's small laryngoscope will be found very easy. When ether-insufflation anaesthesia is being used the introduction of the catheter is comparatively easy, but one should not attempt the introduction of the larger laryngeal endotracheal tube until the patient is in the third stage of anaesthesia, with the muscles thoroughly relaxed. When one is attempting to use nitrous oxide alone, one's success will depend on the effect of the pre-operative sedative and the speed and skill with which the anaesthetist is able to introduce his laryngeal tube.

If we wish to introduce the endotracheal catheter or tube through the nose and thence into the trachea, it is necessary to use Magill's method with the soft rubber tube curved to fit the larynx, cocaineizing of the larynx; or after introducing the tube or catheter through the nose to pick it up with a pair of angular forceps in the pharynx, and with a laryngoscope direct it into the trachea in that manner.

Procedure in various operations on the head and neck.—The majority of our surgery has been done under positive pressure insufflation endotracheal ether anaesthesia, for the reason that the use of nitrous oxide adds to the expense, and any plastic operation extends from one and one-half to three hours; we have therefore used this method generally all through our work and have found it very satisfactory. In operations on the head and brain we use this method and carry the patient under a light ether anaesthesia, the rubber tube extending some distance from the patient, the depth of anaesthesia being controlled by looking under the sheets and occasionally seeing the pupil, or, if this is impossible, keeping the patient under as light anaesthesia as possible and waiting for signs of phonation or coughing. Or one may use W. E. Brown's respiratory manometer. In operations about the forehead, eyes, cheeks, ears, etc., the anaesthetic is controlled by watching respiration and asking the surgeon or assistant to occasionally let you have a glimpse of the pupil. Always have suction on hand to keep away excessive

mucus which may be blown down the mouth or nose. This is more or less present in endotracheal anaesthesia in operations on the nose. The initial precaution to take is to see that mucus and blood are not blown up during expiration into the naso-pharynx and nasal passages, thus contaminating the surgeon and his field of operation. This is easily accomplished by inserting a Connell tube downwards over the base of the tongue and catheter. This directs the expiratory air out through the mouth which would not otherwise come out this way even with the post-nasal plug *in situ*. For operations in the mouth, particularly on the upper and lower teeth, impacted molars, etc., and pathological bone conditions, we have got along very well by lightly packing the side of the mouth and jaw while the operation is being performed. This pack tends to absorb the blood, but is not tight enough to prevent the expiratory air from escaping. The anaesthetist should always be on the watch to prevent the surgeon from pushing this packing down too tight in the pharynx, or from pushing the base of the tongue down. We have found it necessary on very rare occasions to pass the catheter through the nose into the pharynx and thence into the trachea, but have done operations upon the soft palate, and pharyngeal wall easily without this method, although we have always been prepared to use it. Operations upon the lower jaw and neck have been a very simple procedure.

If it were not for the expense of nitrous oxide and oxygen we feel that inhalation anaesthesia with the large tube is the most practical and the easiest on the patient and surgeon. The effect of the pre-operative sedative and, consequently, the relaxation of the patient will depend on whether we are able to use nitrous oxide and oxygen without ether during the anaesthesia or have to add a slight amount of ether from time to time. One of the great advantages of this is that the patient becomes conscious almost immediately as soon as the large catheter is withdrawn at the end of the operation, and the surgeon or anaesthetist is able to make him understand that he is not to move his head in a certain position; also there is no vomiting of any account. In some plastic operations, as for instance, where tubular grafts are taken from the arm to the face, the risk of the patient breaking the bridges away by the movements of his head or arm when recovering from the ether

is prevented by using this endotracheal nitrous oxide oxygen, as he becomes conscious almost immediately at the end of the operation and is able to understand instructions. Another advantage is that it is possible to use the actual cautery or diathermy in the mouth without the fear of having an explosion. The size of tube that is used is as large as we think it is possible to introduce into the trachea, and packing should be placed around it in the lower pharynx, to prevent the inspiration of air or the aspiration of blood. The large catheter does not seem to be in the way of our surgeons, and although we have had difficulties in the past with the silver wire-woven gum elastic catheter kinking and obstructing the airway, the later ones that have been manufactured have a tighter weave, and this tendency has been almost eliminated. In giving nitrous oxide with this method the anaesthesia is consequently very light, and at times there may be a tendency for the patient to close the jaw, so that a suitable gag should be kept in

the mouth at all times. We have found this type very valuable in anaesthetics for diabetic patients who have to have nose and throat operations performed and to whom the surgeon wishes that little or no ether be given. When the large catheter is introduced in the trachea there is invariably a spasm and the patient holds his breath sometimes for an alarming period, and may become very cyanotic, but if the catheter is immediately connected to the gas machine and 100 per cent oxygen forced into the lungs it is very rapidly overcome. After the catheter has been introduced there is a tendency to cough with the least movement of the jaw, head or tongue, but this soon passes away as the operation proceeds. We have also found that in some patients the addition of ether tends to cause more coughing, so that when you turn the ether off the anaesthesia is smoother. Also we shut off the carbon dioxide and do not encourage deep breathing, because the quieter the respiratory effort, the smoother the anaesthetic.

THROMBOPENIC PURPURA: REPORT OF A CASE WITH RECOVERY FOLLOWING SPLENECTOMY*

BY L. J. SOLWAY, B.A., M.B., M.R.C.P.,

Toronto

THE problem of purpura hæmorrhagica is as yet mainly unsettled. While its clinical features were outlined as far back as 1775 by Werlhof, its essential blood picture is recent knowledge. The platelet deficiency was described by Denys in 1887, while Hayem in 1896 noticed the non-contractility of the clot, and Duke, in 1910, described the prolongation of the bleeding time. While Frank considered the cause as a failure of production of platelets, Kaznelson argued that it was excessive destruction, both ascribing the cause to the spleen. On the other hand Hess, describing the capillary resistance test, believed that it was primarily a reticulo-endothelial disturbance, with hyperpermeability of the endothelium as its essential feature. The toxic factor may first act on the platelets increasing their destruction and, when these disappear, may act on the endothelium through removal of some protective mechanism exercised by the platelets on the endothelium (Bedson¹).

Brill and Rosenthal² further suggested a qualitative change in the platelets in many cases. Considering its close association with other bone-marrow dyscrasias the opinion is held by many that it is primarily a bone-marrow dysfunction, due to known or unknown toxic or septic factors and it has therefore been named thrombopenic myelophthisis (Lescher and Hubble³), or myeloparesis (Strasser⁴). It may well be that, whatever the primary factor, the same ultimate symptom-complex is reached by different routes, whether due to non-formation of megakaryocytes, non-maturation of the platelets, or their excessive destruction.³

Nor is there any agreement as to splenectomy. Many consider it specific therapy, others advise it in properly selected cases, while still others are skeptical and adopt splenectomy only as a last resort. Whipple,⁵ Spence⁶ and Eliason and Ferguson⁷ have reviewed the cases on record.

The following case, under observation for five years, which shows a very favourable result for splenectomy, is deemed worthy of record.

*From the Medical Service, Toronto Western Hospital.

History of illness.—Miss D. B., aged 28, was admitted to the Toronto Western Hospital on March 27, 1928, suffering from metrorrhagia and purpuric spots on various parts of her body. The family history was negative, no one else of her near relatives having shown any tendency towards excessive bleeding. Her own past history was negative up to four years before admission, when several attacks of severe nosebleeding followed each other at about a week's interval. The following month menstruation was excessive, and grew worse during the next few months, lasting at times twelve days. During that period she would bruise more easily and ecchymoses appeared on her body on the slightest trauma, or without any. On one occasion patient noticed blood clots in her mouth in the morning and several times slight oozing from the gums for a day or so. The menorrhagia, at first, did not interfere with her daily occupation, but during the last two years she became progressively worse, so that for the last six months she was unable to carry on at all.

In March, 1927, she attended the Cornell Medical Clinic in New York, and a tentative diagnosis of purpura hæmorrhagica was then made. Physical examination was negative except for marked pallor, ecchymoses and low blood pressure. Blood findings then were: hæmoglobin, 60 to 65 per cent; red blood cells, 3,700,000 to 2,700,000; white blood cells, 8,000 to 11,000; polymorphonuclears, 64 to 68 per cent; lymphocytes 23 to 32 per cent; eosinophiles, 4 per cent; bleeding time, 2 to 7 minutes; coagulation time, 6 to 7 minutes; blood Wassermann, negative; platelets, 194,000 to 360,000; blood calcium, 9.3 to 10.4 mg.; reticulated cells, 2.9 per cent.

any untoward effects. Convalescence was uneventful and patient was discharged on May 6th.

Pathologist's report of the microscopic examination of the spleen, which was $\frac{1}{3}$ normal in size and harder than usual: "There appears to be a very diffuse fine fibrosis scattered throughout the pulp tissue. The sinuses contain moderate quantity of red blood cells, and a considerable proportion of eosinophilic leucocytes. The germinal centres are moderately large, and the surrounding lymphoid tissue is extending for a fair distance into the pulp tissue."

Subsequent history.—The immediate results of the operation were striking, with prompt arrest of all hæmorrhage and return of subjective sense of well being. On discharge from hospital, May 6th, platelet count was 240,000, and remained thereabout on repeated examination during the next two years. Menstruation was arrested for five months, but then returned normally. Now and again, subcutaneous purpuric spots on thighs recurred with no evidence of any other hæmorrhage.

On October 20, 1930, she was re-admitted to the hospital complaining of an irregular diarrhœa with loss of weight and general malaise. Physical examination, and x-ray of the gastro-intestinal tract were negative; gastric analysis showed no free HCL. Blood examination showed: red blood cells, 4,150,000; white blood cells, 14,600; hæmoglobin, 65 per cent; platelets, 240,000 per c.mm. Differential count: neutrophiles, 69 per cent; lymphocytes, 16 per cent; monocytes, 10 per cent; eosinophiles, 4 per cent; mast-cells, 1 per cent.

Blood smear.—"This shows a macrocytosis, probably of juveniles, many of which show Howell-Jolly bodies.

BLOOD EXAMINATIONS DURING HOSPITAL STAY

	Hæmoglobin	Red blood cells	White blood cells	Platelets	Bleeding time	Clotting time	Reticulocytes	Polymorphonuclears	Lymphocytes	Monocytes
	Percentage	Millions		(Fonio method)	Min.	Min.	Percentage	Differential		
March 27. Admission.....	30	2.5	15,000	150,000	15	8.5	30	70	17	3
April 3. After trans....	25	2.8	16,000	100,000						
April 10. After 2 trans...			93,000		31	12		90		
April 14. After 3 trans...			51,000		6					
April 17.	55	3.6	19,600	32,000				68	12	11
April 23. After 4 trans...	85	4.5	11,200		15	6				
April 25. Before op'n....	85	4.5	11,200	34,000		5				
April 26.		3.5		650,000						
April 30.		3.5		200,000						

From March 17 to April 2, 1927, she was admitted to the New York Hospital, and while resting in bed was apparently much improved. In August of the same year she was transfused at the Harper Hospital, Detroit, for severe menstrual bleeding. Twelve days before the present admission, the patient began to menstruate, and continued so excessively that she was admitted to the hospital.

Physical examination.—On admission, physical examination was essentially negative, except for marked pallor of skin and mucous membranes, with ecchymoses on hands, arms, thighs. There was continuous uterine hæmorrhage. Blood pressure 92/60. Pelvic examination revealed the uterus to be small and retroverted. The tourniquet test was positive. Retractivity was very slight after fifty-six hours. Blood calcium was 9 mgm.

During the next four weeks the patient received four transfusions, but, although her general condition was much improved, there was no arrest of the uterine hæmorrhage. On April 25th splenectomy was performed by Dr. A. I. Willinsky under ether anæsthesia, without

There is no polychromasia or stippling. It is free from nucleated forms. Supravital stains show an increase in reticulocytes. The platelets are approximately 240,000 per c.mm. There is a definite leukocytosis with increase in monocytes and eosinophiles. The neutrophiles show a left shift, stabs amounting to about 6 per cent, and there is a fair number of juveniles. This hæmogram represents a fairly active regeneration of bone-marrow."

The patient has been well and showed no evidence of recurrence in February, 1933.

COMMENT

Several points of special interest in this case may be noted. The absence of evidence from blood examination during the early period agrees with Frank's original observation that there may be no thrombopenia in the inter-

mittent period in the chronic stage. The active response of erythropoiesis and leucocytosis during the active bleeding may be taken as of favourable prognosis for operation. The response after operation agrees with the general observation that the bleeding stops almost immediately after splenectomy. Her purpura after operation was at no time associated with

platelet deficiency. The absence of HCl on gastric analysis was a single observation and has not been repeated.

REFERENCES

1. BEDSON, *The Lancet*, 1924, **2**: 1117.
2. BRILL AND ROSENTHAL, *Arch. Int. Med.*, 1923, **32**: 939.
3. LESCHER AND HUBBLE, *Quart. J. Med.*, 1932, **1**: 430.
4. STRASSER, *Wien. klin. Wchnschr.*, 1932, **45**: 548.
5. WHIPPLE, *Surg., Gyn. & Obst.*, 1926, **42**: 329.
6. SPENCE, *Brit. J. Surg.*, 1928, **15**: 466.
7. ELIASON AND FERGUSON, *Ann. Surg.*, 1932, **96**: 801.

THE EARLY DIAGNOSIS OF CANCER OF THE INTESTINE*

BY B. J. BRANDSON,

Winnipeg

X.

AT the present time any advance in the treatment of cancer depends more upon the early diagnosis than anything else. The surgical treatment of cancer, as well as its treatment by radiation, in order to be successful, must be instituted at the earliest possible time. The success of our efforts also depends upon the organ involved. Not so long ago cancer of the bowel was looked upon as a most hopeless form. Cures were regarded by many as next to impossible, and any operation as palliative, prolonging life only for a little while. Also, a colostomy was looked upon with such horror by many patients that they refused operation till perhaps obstruction was complete. Any operation undertaken at such a late date is necessarily only palliative and a cure is seldom to be hoped for. Fortunately for the reputation of surgery and the welfare of our patients we are now taking a much more optimistic view than formerly. We have now come to look upon the prognosis in cancer of the bowel as more favourable than in most other forms of cancer, provided that operation is undertaken at a fairly early date.

Cancer of the small and large bowel occurs in about the same proportion of cases as cancer of the stomach. More than 95 per cent of cancers of the intestine occur in the large bowel. The author has operated upon only four cases of malignant growths of the small bowel, one a metastatic sarcoma and three adeno-carcinomas. Only one of these cases was positively diagnosed

before operation, and that he thinks is a common experience, as symptoms are usually so obscure that it is very difficult to make a positive diagnosis. Of the three patients with carcinoma one is living and well 16 months after operation; another is still well after seven years; the third died of acute pancreatitis five years after operation, and a post-mortem showed no evidence of a recurrence of the carcinoma. The author's experience in these three cases differs from that of many others who claim that these cases metastasize early and extensively and that even a "five-year cure" is very rare. It will not be necessary to allude further to these growths of the small intestine, as positive diagnosis is seldom possible but is usually made at operation when looking for the cause of *subacute obstruction* of the small bowel.

The symptoms of carcinoma of the large bowel depend largely upon the site and character of the growth. The two main types of growth are the soft medullary adeno-carcinoma, most often found in the cæcum or the lower sigmoid, and the small encircling scirrhus form, causing a stricture of the bowel at a comparatively early date. The scirrhus type may occur in any part of the colon. Both varieties have the common characteristic of permeating the lymphatics of the bowel, and because of this peculiarity the growth tends to encircle the bowel at one point rather than to extend longitudinally. Cancers of the cæcum and ascending colon are more commonly large, ulcerating growths, producing obstruction at a much later date than the more common annular growths of the scirrhotic type usually found in the left half of the colon. Both types of growth

* Earlier articles in the series on the early diagnosis of cancer can be found in the *Journal* as follows:—1933, **29**: 465; 1934, **30**: 46, 48, 50, 168, 171, 280, 283, 522.

tend to remain local for a considerable time, an important factor in the prognosis. Metastases usually occur later, by the way of the lymphatics, the peritoneum or by the blood stream to the liver. But the relatively late extension of these growths renders them favourable for a radical cure if operation can be undertaken early.

In the early stages of the disease cancer of the large bowel very often presents no outstanding symptoms. Very often the symptoms are so vague as to arouse only a suspicion of the presence of cancer. Once our suspicions are aroused, however, further painstaking examination will very often give conclusive evidence of its existence. In those cases where the findings are negative it is frequently not safe to conclude that cancer is not present. Unless there is definite improvement, sufficiently marked as to entirely satisfy us, the examination should be repeated in a few weeks' time, hoping that by not finding any further evidence of disease at that time we would be justified in concluding that our first suspicions were unfounded.

Of all the symptoms leading us to suspect the presence of cancer of the bowel, I think any *change in bowel habit* merits first consideration. Any person past middle age who complains of increasing constipation should be suspected of having cancer. Constipation is most characteristic of tumours of the left half of the colon. In tumours of the cæcum and sometimes the rectal ampulla the patient may notice diarrhoea as the first symptom of change in bowel habit. When this history of change in bowel habit is obtained, a careful examination of the abdomen, including sigmoidoscopy, should be made. The persistent neglect of a sigmoidoscopic examination is a black mark against many a practitioner of medicine. Too often when such an examination is clearly indicated the patient is dismissed with a prescription for some useless drug instead. A case in point was a man who came to the author six years ago with a large growth at the recto-sigmoidal junction, after being under a doctor's care for a whole year, during which time a rectal examination was never made. This patient is, after a radical operation, still alive and apparently well, illustrating the late spread of the disease in many of these cases.

More than half of the patients suffering from

cancer of the colon will have constipation as a prominent symptom for a long time before they consider themselves as really ill. Sometimes *complete obstruction* is the first symptom for which the patient seeks relief. When obstruction occurs without a previous history suggesting cancer the growth is usually situated at the splenic flexure, descending colon or sigmoid. Alternating constipation and diarrhoea, so often spoken of, is not an early but usually a rather late symptom of cancer of the colon.

Next in importance to change in bowel habit, I would place the presence of *blood in the stool*. This is a fairly common early symptom occurring in between 80 and 90 per cent of all cases. The patient himself usually attributes this bleeding to the presence of hæmorrhoids, and too often the doctor whom he consults concurs in this, often without any examination of the patient. The amount of blood is usually small, streaking the stool or being mixed with it. Sometimes the stool will be dark and of very offensive odour. When the bleeding is from internal hæmorrhoids it is usually more profuse; the blood is fresh and relatively odourless. Rarely a rectal fissure may cause the bleeding. Then the stool will show streaking of fresh blood, and pain on defæcation will be pronounced. In any case, blood in the stool in an adult should always arouse the suspicion of cancer and should lead to a careful, painstaking examination.

As in cancer elsewhere, *pain* is not usually an early symptom. Some patients are fortunate enough to develop a moderate amount of pain or at least uneasiness fairly early, and this leads them to seek advice earlier than they would otherwise do. The pain is most often in the midline below the umbilicus. This pain often precedes the symptoms of definite obstruction, and may be present at intervals for some time before more definite symptoms of obstruction develop.

In cancer of the stomach, *weakness, anæmia, and loss of weight*, are often the earliest symptoms. In cancer of the cæcum or ascending colon, the same clinical picture sometimes presents itself. But more often, a cancerous cachexia is a *late* symptom in cancer of the large bowel, and when once present shows a condition that has gone past hope of a cure. Only in cancer of the cæcum and ascending colon will one sometimes find a palpable mass

before other symptoms have become fairly well marked.

Before using the proctoscope or sigmoidoscope a careful digital examination should be made. Tumours of the rectum that can be reached by the finger can usually be accurately diagnosed by touch alone. The deep ragged crater of the malignant ulcer with its infiltrated base can scarcely be mistaken for any other condition. Sometimes one can feel a mass in the pelvis on rectal examination, especially where a growth in the sigmoid has fallen down on the pelvic floor. In some late cases metastases from carcinoma anywhere in the abdomen are found in the posterior cul-de-sac, forming the so-called "Blumer's shelf", but one would not look for these metastatic masses in the comparatively early case.

After the digital examination the proctoscope should be used, and, if that yields no information, then the sigmoidoscope. If the growth can be definitely visualized, no further examination is necessary, except in those cases where we are in doubt as to the nature of the growth. Then a biopsy must be done in order to secure the necessary information. The sigmoidoscopic examination may be negative, except for showing blood coming from higher up. In such a case, we have by our examination secured additional evidence of carcinoma in the colon.

In those cases where diagnosis cannot be made from signs and symptoms and the use of the proctoscope or the sigmoidoscope, the *x-ray examination* is often of very great value. The proper preparation of the patient is essential. A dose of castor oil should be given the night before, and an enema in the morning, washing out the bowel until the water returns clear. In the hands of the expert radiologist very few carcinomas of the bowel that have reached the stage of causing symptoms are missed. But, unfortunately, errors do occur, and sometimes we are lulled into a sense of false security by a negative x-ray of a patient who a few days later develops symptoms of acute obstruction. Here, as elsewhere, clinical signs and x-ray findings must be considered as parts of the same picture. When the x-ray fails to confirm our suspicions of cancer of the bowel, that does not say that our opinion based on clinical signs and symptoms is wrong. Unfortunately for our patient the subsequent history often shows that our first suspicions were well founded. It

should be emphasized that barium by the mouth should not be given in any case of possible obstruction, but the barium enema alone should always be employed. Barium by the mouth is not without danger, because it can produce acute obstruction when superimposed upon a partial process. In growths in the colon the barium enema is not only free from danger but gives much more accurate information than the meal.

DIFFERENTIAL DIAGNOSIS

In considering the differential diagnosis *diverticulitis of the sigmoid* must be considered. Differentiation between these conditions is by no means easy when the diverticulitis has gone on so far as to produce partial obstruction. Clinically, the usual absence of hæmorrhage in diverticulitis and its very common occurrence in carcinoma is a point of the greatest value. The author has had two cases of diverticulitis under his care within the last year that illustrated this very well. The x-ray usually clears up the question, as the diverticuli generally show very clearly. In one of the author's cases the x-ray failed, and only after excision of the growth was the diagnosis made.

Hyperplastic tuberculosis of the cæcum resembles a malignant lesion in its symptoms and clinical course. Often there is evidence of tuberculosis elsewhere and the disease most frequently runs a febrile course due to secondary infection. *Actinomycosis* involving the cæcum is a very rare condition that may be mistaken for carcinoma. In actinomycosis, sinus formation occurs in the course of the disease, and the discharge from these sinuses contains the characteristic "sulphur bodies." An *appendiceal abscess* that has run a very chronic course may be mistaken for a neoplasm. This is especially true if the appendix is situated retrocæcally. A careful analysis of the history, together with the temperature readings and the leucocyte count, should give the correct diagnosis.

SUMMARY

1. Any change in bowel habit of a patient of early middle age or old age may mean early carcinoma of the bowel.

2. Blood in the stool, either gross or occult, should always make one suspect the presence of cancer until investigation shows some other cause.

3. The most important cause of bleeding from the bowel is cancer.

4. Pain is only an occasional early symptom of cancer of bowel, and when it occurs usually indicates partial or impending obstruction.

5. Weakness, loss of weight, and anæmia are often early symptoms of cancer of the cæcum and ascending colon.

6. Digital examination should precede the use of the proctoscope or sigmoidoscope.

7. When the growth can be felt or seen, x-ray examination is unnecessary.

8. Biopsy is indicated if in doubt as to the nature of an accessible growth.

9. Barium by the mouth should never be given in cases of possible obstruction, but the barium enema employed exclusively.

10. The x-ray examination should always be the last made, as other less troublesome examinations may render it unnecessary.

A SURVEY OF DIABETIC DEATHS IN ALBERTA*

BY HEBER C. JAMIESON, M.B.,

Edmonton

WHILE medical knowledge has increased greatly in the last fifty years the application of this knowledge to the needs of the general public has not kept pace. This was shown conclusively in a report recently published by a committee on the cost of medical care in the United States after an intensive study of the situation covering a period of five years.

In casting about for a new angle of approach to this subject it seemed that a survey of the diabetic problem of the Province of Alberta would be of value, and the opportunity there presented of discovering if the profession was lagging behind in the application of the methods available for the effective treatment of this disease. As a result of the investigation certain phases of the question called for discussion. This material forms the basis of this paper.

Ten years ago insulin was given into the hands of the profession. Has its introduction and have the improved methods of treatment fulfilled their promise? Certain questions can be asked on the basis of mortality statistics: (1) Was the course of the death rate seriously altered after the introduction of insulin, and to what extent? (2) If so, did the improvement continue and increase in degree? (3) At what ages was the change most evident? A fourth question might be asked by the social economist—Did an increased capacity for work or improvement in health result?

To the first question of the statistician one must answer "No." The diabetic death rate is

increasing in almost all civilized countries. Where then, is the value of this new remedy? It would seem that deaths from primary coma, that is coma without infection, are being reduced, but deaths from arteriosclerotic conditions are increasing. A careful study of the causes of death in Alberta gives valuable information. For the purposes of comparison the twelve-year period was divided into two sections. The first was composed of the years 1921 to 1926 inclusive; the second continued the years from 1927 to 1932 inclusive. In the latter period insulin was readily available, being supplied free by the Provincial Department of Health to those who could not pay. In the earlier period its use in the province was not widespread, nor were the methods of treatment so well understood as in the more recent period.

The two following Tables give in concise form the information gleaned in this study.

TABLE I
CAUSES OF DEATH IN DIABETES IN ALBERTA

<i>First Period</i>	<i>1921-1926</i>	<i>Total deaths 287</i>
Coma	142 or 50%	1 in 2
Infection	29 " 10%	
Gangrene	20 " 7%	1 in 14
Heart and arteries	24 " 8%	1 in 12
33.5 per cent died before age 40		
66.5 per cent died after age 40		
<i>Second Period</i>	<i>1927-1932</i>	<i>Total deaths 366</i>
Coma	117 or 30%	1 in 3
Infection	42 " 11.5%	
Gangrene	40 " 11%	1 in 9
Heart and arteries	104 " 28%	1 in 4 (almost)
21.1 per cent died before age 40		
78.9 per cent died after age 40		

* From the Department of Medicine, University of Alberta Hospital, Edmonton.

TABLE II
COMPARISON OF JOSLIN'S FIGURES WITH THOSE
OF ALBERTA

	<i>Joslin I</i> 1894-1922	<i>Joslin II</i> 1926-1930	<i>Alberta I</i> 1921-1926	<i>Alberta II</i> 1927-1932
	Percentage	Percentage	Percentage	Percentage
Coma	51	15 *	50	32
Infection	16	16.4	10	11
Gangrene	4	8.3	7	11
Heart and arteries	17	46	8	28

* Since this paper was submitted for publication we have learned that Joslin's figure here is now less than 5 per cent.

What is the extent of our knowledge concerning this disease at the present time? In the short time available one can glance only at some of the newer and most significant work. The tendency is now to divide diabetes into two forms, separated as to cause. The first is due to destruction or damage of the cell islets of the pancreas. It was once thought that all were due to this cause. Not so, now. There are several theories to explain the other type. One supposes a sugar centre in the brain and increase of blood sugar as a stimulus to activate the pancreas. The right vagus by means of fine filaments supplies the cell islets, and overstimulation by continued high blood sugar causes paralysis of these nerve endings and so diminishes the secretion of insulin. Another theory has for its basis the action of the adrenals, pituitary and thyroid glands on the internal secretion of the pancreas, or, at any rate, the utilization of ingested carbohydrate by the body tissues. What is the explanation, you may ask? First it is well known that adrenalin when injected in hypoglycæmia will raise the blood sugar and counteract insulin. Pituitary extract does this to a lesser degree. The proponents of this idea believe that these hormones depress the secretion of insulin and so give rise to higher blood sugar values and to a form of diabetes.

Thyroid extract given daily to rabbits for a week causes them to become relatively insensitive to insulin, so much so that ten times the convulsive dose produces no signs. Prolonged administration of thyroid extract brings about two changes: (1) it renders the liver incapable of forming or at least storing glycogen; (2) it counteracts the action of insulin.

A case of myxœdema and diabetes was reported by the author some years ago. Admitted to hospital with myxœdema and a trace of sugar in the urine, the patient became a severe diabetic when thyroid extract brought his basal meta-

bolism to normal. By discontinuing the extract he would become myxœdemic again. This is an example of the influence of the thyroid extract over that of insulin. The glycosuria of hyperthyroidism is another illustration of this effect.

The evidence in support of pituitary regulation of insulin secretion is found in the work of Houssay, of the Argentine. He found that on removal of the pancreas of dogs diabetes resulted. The removal of both pituitary and pancreas did not cause this disease. But if in this case pituitary gland substance was grafted under the skin of the animal typical diabetes resulted. Clinically, one finds glycosuria frequently in acromegaly, and there are many patients with pituitary dysfunction in whom glycosuria is a prominent sign. These patients are overweight, have severe headaches often, and have diminished fields of vision. The glycosuria of pregnancy is usually due to pituitary over-activity.

The question naturally arises, "How is one to distinguish which form he is dealing with in an individual case?" This can be done sometimes by treatment. An insular diabetic will require a certain amount of insulin, and this will not vary from time to time. The other form may require insulin for a time and then discontinuance may leave the patient sugar-free for variable periods, with an increased carbohydrate tolerance without insulin. This tolerance is lost sooner or later, to be re-established only by a return to insulin.

This is a very brief summary of some of the newer conceptions of diabetes. Time does not permit a discussion of the treatment of the diabetic by any of the various diets. A consideration of some of the complications will be entered into and the management outlined.

First comes coma. It has been seen that deaths from this have been reduced, but they can still be lowered by proper treatment much below the present figure. Thirty per cent is too high for a mortality rate. There should be few deaths from primary coma. Coma is due to a ketosis, and it may appear in some with slight and in others severe ketosis. It should not develop in a well treated diabetic unless infection occurs. Warren says "Sepsis is the worst enemy of insulin." Even slight infections, such as septic gums, will lower the sugar tolerance of a patient. Insulin mixed with pus and injected into rabbits has been found to lose its power. Every patient in coma requires as much con-

sideration as one with an acute abdomen. The more speedily one starts treatment the greater the chance of saving life. Too many temporize and valuable time is lost. Who ever heard of a surgeon making a skin incision over a ruptured appendix and then going home, leaving instructions to be called in an hour or two if there should be any change? Yet the giving of ten or fifteen units of insulin to a patient in coma and waiting to see what happens is analogous, and it is common practice.

The importance of arteriosclerosis as a complication of diabetes is increasing. As we have seen, more and more patients are living longer, and in consequence arterial change and the signs and symptoms of it bulk larger in the complaints of the diabetic. What causes it and how does it develop? It is believed that increased lipoids in the blood are responsible for it. A few words about the pathological progress of arteriosclerosis will explain some of the problems of treatment.

The intima and the inner two-thirds of the media of the larger blood vessels obtain their nourishment directly from the blood stream, a continuous flow of plasma percolating through the intima as far as the elastic layer. The facility with which this plasma permeates the intima depends on the pressure in the vessel. The greater this pressure the more saturated does the intima become. Only in some arteries such as the aorta, carotids and coronaries does part of the media share in this nutritional bathing. In these arteries the elastic layers of the intima are rather loosely knit to the media. It is on these facts that the modern conception of arteriosclerosis is formed. Lipoids or cholesterol esters (whether from the food or from metabolic changes within the body is not clear) are present in the plasma which soaks the intima, and they are deposited close up against the elastic laminae and in many cases between their fibres, where there appears to be a cementing substance which is replaced by cholesterol esters. While this deposition of lipoids is taking place certain protein substances from the blood also enter the intima and cause a hyaline swelling. At the same time there is a true hypertrophy and new formation of collagen and elastic fibres. When this process attains an advanced state necrosis may occur. The lipoids in the deposits change and cholesterol is let loose, and at the same time there begins the deposition of calcium

salts, producing the condition known as arteriosclerosis.

Now besides these two substances, the lipoids and the protein bodies which we have just considered, several other constituents of the blood plasma play a part in the changes which take place in the vessel wall structure. The chief of these is a mucin. This substance which is normally present in the blood, as soon as intimal changes occur passes through the elastic layer and forms a deposit in the media. Now we have the complete picture of the arteriosclerotic process as it affects the intima.

One must consider however the calcification of the media, if only briefly, since it is present so frequently in the diabetic. This is not preceded by any deposition of lipoids, but takes place in the muscular layer. There occurs a calcifying process of the muscle fibres and the collagen fibres about them, and this is followed by necrosis. The peculiarity of this process is its predilection for certain vessels, particularly the tibials. The aorta and the heart and cerebral arteries escape. It is believed that the special neuro-muscular layer of the leg vessels predisposes them to calcification. Lipoid infiltration of the intima and calcification of the media of course may co-exist. This explanation of the formation of arteriosclerosis is of particular importance in relation to the diabetic, because there is an increase of cholesterol in the blood in this disease. Joslin believes that arteriosclerosis develops from ten to twelve years earlier in the diabetic than in the non-diabetic. It has been also demonstrated that with increased blood sugar there is increased permeability of the tissues, a condition favouring the laying down process of lipoids in the blood-vessel walls. The insulin treatment shows a lowering of death rates from coma, but an increased rate from arteriosclerosis. The patients who are being steered clear of the Scylla of coma and infection are still in danger of the Charybdis of gangrene, coronary occlusion and apoplexy.

Warren found among 300 fatal cases autopsied that 55 had gangrene, and in 27 it was the primary fatal lesion. Joslin reports that in the last four years gangrene caused 1 in 11 diabetic deaths. The Alberta experience was 1 in 11 in the first period and 1 in 14 in the last period. One must remember here, however, the smaller percentage of middle-aged and old people in a new country before making too much of this

favourable showing. Warren calls attention to the association of coronary sclerosis with gangrene. Of the 55 cases of gangrene just mentioned, 25.5 per cent showed infarcts of the heart at autopsy. Nathanson, in reviewing 100 autopsies on diabetics, found extensive coronary disease in 52 per cent of diabetics over 50 years of age, as against 8 per cent in general autopsy material.

Gangrene in the diabetic may be precipitated by cold, tight-fitting shoes, trauma or the paring of corns, to mention a few causes. The care of the feet is of supreme importance to the arteriosclerotic. Cleanliness, correction of depressed arches, proper fitting shoes, are essential as preventive measures. When gangrene develops it is usually of the wet type and infection frequently accompanies it. Treatment must be prompt. Sufficient insulin should be given to cause utilization of enough carbohydrate to give a balanced diet of sufficient calories for maintenance, and, if fever is present, sufficient to meet the increased needs. A good rule allows a 10 per cent increase of calories for every degree in rise of temperature above basal needs. Keep the blood sugar within normal bounds. A radiogram of the limb will show the condition of the vessels. If amputation is advisable, it is wiser to attempt getting the metabolic condition of the patient as near normal as possible. When operation is

decided on there is usually only one site of election—the middle third of the thigh. Quick efficient treatment, however, will often save feet that show periosteomyelitis and which look hopeless. One must remember the ever-present danger of coronary occlusion from hypoglycæmic attacks.

What are the lessons to be learned from our study:—

1. That deaths from coma are decreasing, but not to the degree possible.
2. Diseases of the heart and arteries are increasing greatly.
3. Gangrene is on the increase, as evidenced by the deaths.
4. That there is too much temporizing in surgical measures. One amputation is sufficient, if done in the middle third of the thigh.
5. One must expect more nephritis, more coronary thrombosis, more apoplexy.
6. Care of the feet is of paramount importance.
7. That death certificates might be made more valuable by some more definite statement than "Diabetes, coma, myocarditis or general debility."
8. Diabetes is a disease that requires careful management.
9. That notwithstanding free insulin, we are not applying available knowledge.

SUDDEN DEATH FROM DINITROPHENOL POISONING: REPORT OF CASE WITH AUTOPSY.—F. E. Poole and R. B. Haining, stress the fact that every one who has commented on the use of dinitrophenol has emphasized the importance of restricting its clinical trials to carefully selected cases under constant supervision. However, it appears that the compound is being widely popularized as a weight-reducing agent and is being bought and used with no competent direction. This seems highly deplorable in the present state of knowledge of human responses to dinitrophenol. Thorough and extensive animal experiments have been performed (notably by Tainter and Cutting and by Magne, Mayer and Plantefol) and the toxic effects and the fatal dosage for animals have been accurately determined. This work, however, must not be presumed on too freely in dealing with human beings, and it can have no value whatever in predicting or preventing the occurrence of severe allergic manifestations. There is no antidote for dinitrophenol poisoning. The only measures that have seemed to reduce the mortality in animals have been administra-

tion of fluids and cooling baths. In dinitrophenol-poisoned munition workers Mayer found that intravenous injections of dextrose constituted the most effective treatment. This seems rational because of the marked loss of tissue glycogen that has been shown to occur. Morphine allays the excitement and the dyspnoea and may check the rise in temperature, but it cannot halt the process of intoxication, and, in dogs poisoned with dinitrophenol, morphine does not affect the mortality. In the case of sudden death from dinitrophenol poisoning that the authors report, the victim heard of the compound from a friend and bought and used it without competent supervision. A physician was not consulted until a few hours before death. The dosage in this case was high, but within the presumed limits of safety, so the fatality should probably be regarded as an example of allergic idiosyncrasy. Before taking dinitrophenol, the patient had been taking desiccated thyroid extract, one-fourth grain (0.016 Gm.) three times a day for about one year. The authors do not know whether or how this has significance.—*J. Am. M. Ass.*, 1934, **102**: 1141.

AN OPEN SAFETY-PIN IN THE STOMACH, REGURGITATED INTO THE ŒSOPHAGUS AND REMOVED BY ŒSOPHAGOSCOPY*

By J. N. Roy, M.D., F.A.C.S.,

*Professor at the University of Montreal, Physician to the Notre-Dame Hospital,
Montreal*

MEDICAL literature, that I have sufficiently perused, allows me to say that this case report is the third one ever published on the present subject. Indeed, an open safety-pin, which locates more or less rapidly in the stomach, and then returns into the œsophagus, where it is removed by œsophagoscopy, is not a common thing. Our distinguished colleague, Dr. Chevalier Jackson,¹ was the first to report the case of an infant, aged one year, which had for seven weeks an open safety-pin in its stomach. Vomiting attacks caused the pin to regurgitate into the œsophagus, point downward. Needless to add, he removed this foreign body very easily in less than a minute. Some years later, Dr. Iglauer² recorded a very similar case. If I publish this case, it is only to describe something unusual.

On February 28, 1933, I was called to Notre-Dame Hospital to see a young girl, aged 17 years, who had swallowed a safety-pin. She said that that same afternoon, about five, when she was taking care of a baby of twelve months with a safety-pin in her mouth, the infant gave her a blow in the face with his foot. This shock produced a reflex movement, and she swallowed this foreign body. After the accident, as always in these cases, symptoms of choking were noticed, followed by a sharp œsophageal pain at the sub-clavicular region. A muco-bloody secretion then came from the mouth for some time.

Admitted two hours later to the hospital, the patient was submitted to a roentgen-ray examination by Dr. Leonard, who observed an open safety-pin in the œsophagus, point upward, directed to the left, the middle part of which was opposite the fourth and the fifth dorsal vertebrae. The keeper of the pin was then about three centimetres below the collar-bone.

On investigating the pharynx I observed an irritation of the mucous membrane, without see-

ing any erosions. I proposed to remove the foreign body immediately. The patient being very nervous, the father consented to the operation, but on condition that his daughter be placed under the influence of an anæsthetic. As there was no contra-indication, a mixture of chloroform-ether was administered; nevertheless the excitement period was rather excessive. After having introduced very slowly the Chevalier Jackson œsophagoscope, I was surprised not to find any pin in the œsophageal cavity. However, at certain places, the mucous membrane was bloody. The roentgenologist, being called again, now localized the foreign body in the stomach, in a transverse position with respect to the vertebral column, and on the left side. Then I decided to see the patient again the next day, with the intention of perhaps prescribing for her the classic treatment used in Europe, which consists in the administration of mashed potatoes mixed with a small quantity of absorbent cotton previously well ravelled out. I have already had the opportunity of speaking of this in two former articles.³ I must mention, however, that Chevalier Jackson is not partial to this treatment. The following morning another fluoroscopic examination allowed us to see that the pin was neither in the stomach nor in the bowels. Search being then continued towards the upper part of the chest, we observed that the foreign body had been regurgitated into the œsophagus, point downward, taking an oblique left posterior position just behind the xyphoid appendix. The spring of the pin was located, in consequence, at about twelve centimetres from the cardia. During the night violent attacks of vomiting had produced this displacement. I decided to intervene a second time, and the patient was again put under anæsthesia. Having introduced the œsophagoscope, I seized with a rotation forceps the spring of the pin, then I pushed down the tube to receive it and close it inside the instrument, and finally I proceeded to the removal.

* Read before Societas Oto-Rhino-Laryngologica Latina, Paris, July 27, 1933.

The duration of the operation required thirty-eight seconds. The pin measured four centimetres long by twenty-five millimetres wide from the point to the keeper, when open.

Post-operative sequelæ were most simple, and the patient returned to her family a few days later, and has continued to be well.

This case naturally inspires me to some reflections. At first I should say that the spasms of the excitement period, provoked by the chloroform-ether mixture on this very nervous patient, had produced the passage of the foreign body directly into the stomach, as twenty minutes before the administration of the anæsthetic a roentgenogram had located the pin at a few centimetres below the collar-bone.

Now, the removal of an open safety-pin, point upward, in the œsophagus of a patient offers great difficulties, and the specialist who takes the responsibility of such a serious case must be perfectly aware of all the endoscopic manœuvres. In so far as the instrumentation is concerned, the one of Chevalier Jackson is without any doubt the best. I should also add that for the removal of this variety of foreign body we must still have recourse to one of the many proceedings of this author, in order to obtain the greatest possible chance of success, as already described by me.⁴ On the contrary, if an open safety-pin is in the œsophagus, point downward, it is easy to take it out. Nevertheless, we should not forget that the foreign body must be at first placed and closed in the interior of the instrument, because without this precaution an erosion of the œsophageal mucous membrane will surely be produced from below upward which might become serious. We must be also very careful when the œsophagoscope is approaching the pin not to press on the spring. If we neglect this detail the pointed limb can penetrate the œsophageal wall and an infection of the tube then take place. Finally, as a complication, we can have a suppurative mediastinitis, which is always fatal. Medical literature relates a certain number of observations of this kind which have ended tragically.

It is generally admitted that a foreign body of the œsophagus which has spontaneously reached the stomach is almost always expelled without incident by the natural passage, and it is especially recognized that, following attacks of vomiting, these foreign bodies are very seldom regurgitated into the œsophagus. When they

are in the stomach we must watch them every day by means of fluoroscopy, and examine the stools. However, at the end of about two months we may consider their removal, unless alarming symptoms have already forced the hand of the surgeon. In certain circumstances, it is possible to extract a foreign body from the stomach by gastroscopy, and Chevalier Jackson has reported among others two very interesting cases of an open safety-pin retained in the pyloric ring in a child; and of a cap of a tooth-paste tube removed by this method.⁵ In other cases, on the contrary, if the object swallowed is too voluminous or irregular to pass the pylorus, or if the stomach cavity contains numerous foreign bodies, as met with amongst lunatics, for example, we must then prefer gastrotomy. The opportune moment to practise this operation, now recognized as benign, due to asepsis, must be determined by the nature of the foreign body, the probability of its passage in the bowels, the time which has elapsed since it had been swallowed, the symptoms observed and the personal experience of the surgeon.

In concluding, I must apologize for having described the treatment of foreign bodies of the stomach in a general manner, and I repeat that an open safety-pin located in this cavity is almost never regurgitated into the œsophagus. Nevertheless, if it succeeds in repassing the cardia it is then easy to remove it. During the endoscopic manœuvres the specialist must however be careful not to force down into the layers of the œsophagus the pointed branch of the pin, which in this circumstance is always directed downwards. And finally, after having seized with a rotation forceps the spring of the pin, he must slide down the œsophagoscope in order to surround and close it before undertaking its removal.

REFERENCES

1. JACKSON, C., Open safety-pin in stomach for seven weeks; regurgitated into œsophagus and removed by œsophagoscopy, *J. Am. M. Ass.*, 1921, 76: 577.
2. IGLAUER, S., Open safety-pin in the stomach, then point downward in the œsophagus. Removal. *The Laryngoscope*, 1927, 37: 839.
3. ROY, J. N., De la nécessité de l'œsophagoscopie pour le diagnostic et le traitement des affections de l'œsophage, *L'Union Médicale du Canada*, 1919, 48: 70.
Ibid., Epingle de sûreté ouverte dans l'estomac d'un enfant. Passage par les voies naturelles. Réflexions, *Ann. d'Oto-Laryngol.*, 1933, 3: 1065.
4. ROY, Epingle de sûreté ouverte pointe en haut, dans l'œsophage d'un nourrisson. Œsophagoscopie. Ablation. *L'Union Médicale du Canada*, 1922, 51: 374.
Idem, Second cas d'épingle de sûreté ouverte pointe en haut, dans l'œsophage d'un nourrisson. Œsophagoscopie. Ablation. *Arch. Internat. de Laryngol., Otol., Rhinol. et Broncho-Œsophagoscopie*, 1927, 33: 431.
5. JACKSON, C., Textbook of Bronchoscopy and Esophagoscopy, Saunders, Phila., 1927, p. 375-6.

MASTITIS ADOLESCENTIUM

By A. E. HARBESON, B.A., M.D., C.M.,

*Department of Anatomy, Queen's University,
Kingston, Ont.*

THE purpose of this paper is to draw attention to a condition which may very readily confuse one and lead to unwarranted surgical attack upon the patient. The axiom that all tumours of the breast should be removed, whether believed to be malignant or not, is well-founded pathologically, with but few exceptions. Among these is the condition met with in the female at puberty, known clinically as mastitis adolescentium.

The breast is a modified sudoriferous gland and as such may be considered an epidermal appendage, but physiologically it is closely related to the reproductive system and it is in this category that it is studied. The epithelial lining of its ducts and alveoli is derived from ectoderm and its supporting connective tissue from mesoderm. Each breast consists of 15 to 20 lobes, each of which is itself a branched saccular gland, the lactiferous duct of which opens on the surface of the nipple near its apex. The main lactiferous ducts subdivide into many interlobular ducts about which are clustered the groups of secreting alveoli, each group forming one of the many lobules included in one lobe of the gland. At the age of puberty, and to a greater degree towards the end of pregnancy, a marked enlargement of the gland and a development of additional lobules and alveoli takes place. There is also an added deposit of adipose tissue at puberty, and with pregnancy this is diminished relatively.

That mammary development at puberty is due to the action of ovarian, follicular and luteal hormones has been shown by the experimental work of Goltz and Ewald who eliminated the nervous system as a factor by resecting the entire lumbar spinal cord of a bitch. The bitch later became pregnant, bore a litter, the mammary glands underwent normal development, and lactation followed. C. W. Turner showed that the follicular hormone stimulates the development of the duct system, and the corpus luteum,

the alveoli. Corner¹ has given experimental evidence that the corpus luteum, acting alone, is insufficient to induce mammary development. Stricker and Grueter² proved that the necessary stimulation for lactation is contained in extracts of the anterior pituitary gland.

Muir³ classifies mastitis adolescentium as a non-suppurative acute inflammatory condition similar to puerperal mastitis. The latter disease he describes as congestive swelling and oedema of the breast as a result of blocking of the ducts or of early stoppage of suckling. Chronic mastitis is said to follow acute mastitis only very rarely. Wakely and Buxton⁴ describe a subacute inflammation of the breast of girls at the age of puberty which may terminate in suppuration. They consider this disease similar to that occurring in infants where infection results from the passage through the mother's contaminated vagina.

From the surgical point of view mastitis adolescentium is stated by Thomson and Miles⁵ to be a physiological engorgement of the breast due to development of the mammary gland's acini. One or both breasts are swollen, tense and painful. Bunts⁶ considers the condition as possibly infectious in origin because of the susceptibility of the gland during physiological activity. Irrespective of the cause, he states that the usual symptoms of inflammation, pain, swelling and local heat are manifested in this disease. He also describes the normal hypertrophy of the breast at puberty as caused by the development of myxomatous connective tissue about the terminal ducts and acini. This is important, since this tissue may become the site of certain periductal tumours which are usually benign. According to Deaver and McFarland⁷ it is difficult to determine at what period a true mastitis is present, since the reaction varies from a very slight to a marked inflammatory process. Rose and Carless⁸ describe mastitis adolescentium as being similar to mastitis neonatorum. They, also, consider it

a subacute inflammation which may terminate in suppuration.

G. W. Crile,⁹ after a study of 1,347 cases of malignant tumours of the breast, concludes that this type of mastitis may be safely exempted from subsequent transformation into a malignant growth. Other conditions which are also exempt are simple cysts, lipomata, simple hypertrophy, acute mastitis, echinococcus cysts, mastitis neonatorum, syphilis of the breast, and traumatic fat necrosis. It is, of course, possible for any lesion of the breast to become malignant, but in the above cases very improbable. In his extensive review Crile found that the age varied from 20 to 87 years. However, cancer of the breast has been noted as early as the eleventh year. In a series of 303 cases of malignancy of the breast in young women Lee¹⁰ was impressed by the very poor end-results after treatment by various methods,

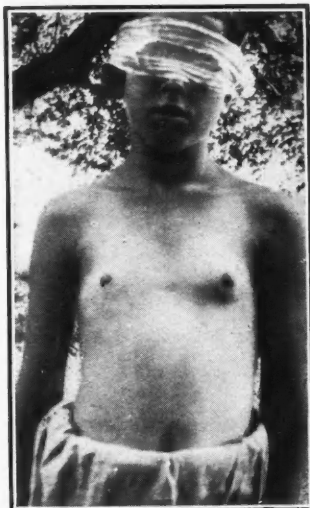


FIG. 1.—Anterior view of chest to show enlargement of left breast and puerile condition of right breast. Taken on July 2, 1933.

and claims that the only one of any use is adequate irradiation. In this group of cases only 15 per cent were correctly diagnosed before operation. In the young, operative interference leads to an early termination within months. He draws particular attention to the most malignant of all mammary tumours, inflammatory carcinoma of the breast. The signs of this condition are: (1) the affected breast is larger than normal; (2) there is a pinkish blush over it; (3) there may be tenderness; (4) there is an increase in local temperature of 1 to 1.5°F.; (5) the tumour is palpable,

but poorly defined; and (6) the opposite breast is invaded rapidly. The majority of these cases terminate fatally in three to four months.

In the descriptions of mastitis adolescentium given by various authorities it is apparent that the condition has been noted by many, but few classify it alike, and its origin has never been fully explained. Although but little may be learned from one case, the writer believes a report of it may be of interest and perhaps of some little help to others.

C. B., a white female, aged 10 years, who had not yet menstruated.

Family history.—Irrelevant.

Past history.—Appendectomy in 1929; tonsillectomy in 1932; laryngismus stridulus in 1932; "pseudo-angina pectoris" in April, 1933.

Present illness.—The patient, when seen on June 28, 1933, complained of pain and tenderness over the site of a tumour in the left breast. This swelling had been noticed for the first time about two months previously. Examination revealed a tumour in the upper outer quadrant of the left breast, about 3.5 cm. in diameter. It was slightly movable, easily defined, not adherent to the skin, and fairly hard on palpation. The areola was fully developed, but the slightly elevated nipple showed no retraction. The tumour appeared to be only slightly tender. There was no secretion on deep pressure. The left breast as a whole was slightly enlarged, principally due to the deposition of adipose tissue. The axillary glands were not palpable. The right breast was puerile and the areola showed no development.

The patient was seen again on July 22nd, and she complained of frequent pain in the left breast of short duration. The tumour was slightly enlarged. A second swelling was found in the upper outer quadrant also, but more distal from the nipple. It was much smaller and had the same characters as the previous mass. At this time the breast was more developed. The right one was still puerile.

When examined on September 13th the left breast showed no changes. The right breast was the site of tumour, about 2.5 cm. in diameter. It was enlarged to about the size of the left breast. The patient complained of pain in the right breast, but none in the left one.

On November 20th both breasts were equal in size, the tumours had diminished somewhat, and there was no complaint of pain.

The writer's conception of the etiology of mastitis adolescentium is that it is caused by a disturbance in the physiological balance between the follicular and luteal ovarian hormones. As has been pointed out above, these hormones are the stimuli which cause development of the mammary gland, the follicular hormone acting on the ducts and the luteal on the gland acini. Theoretically, a preponderance of the luteal hormone would result in overstimulation of the acini and their rapid development before the development of the ducts. There may also be a stimulation from the anterior pituitary hormone and a resulting secretion from the lobules. Since the ducts have not developed as yet, there will be engorgement and

tumour-formation. In a normal gland a slight secretion at puberty may occur, but it is either unnoticed or may be taken care of by the lymphatics.

The condition in this case would appear to be mechanical obstruction of a lactiferous duct. There were no signs of inflammation and an infectious origin seems very doubtful. The three tumours noted were due to blocking of three separate ducts, perhaps because of under-development. The condition would give rise to a moderate degree of pain and tenderness, due to tension of the secretions within the gland lobule. The course of this complaint was prolonged over some months. Most writers classify the condition as acute, and note that it may go on to suppuration. In this case the problem was whether or not the tumours were neoplastic. On the basis of the presence of pain, the age of the patient and absence of definite signs of malignancy, the diagnosis of mastitis adolescentium was made and a biopsy was thought unnecessary.

The treatment in a patient with this condition is chiefly prophylactic. Absolute cleanliness is of first importance. The breast should be protected and supported. Pain may be re-

lieved by the application of lead and opium lotion and small amounts of salicylates. If suppuration occurs incision and drainage are necessary. If the patient's resistance is low Easton's syrup may be prescribed.

CONCLUSIONS

1. Mastitis adolescentium is a condition seen in females at puberty and is caused by mechanical obstruction of the lactiferous ducts.

2. It is the result of unbalance between the follicular and luteal ovarian hormones which bring on mammary development at adolescence.

3. Surgical interference is uncalled for, since the condition does not predispose to malignancy. This is one exception to the rule of removing all tumours of the breast.

REFERENCES

1. CORNER, G. W., *Am. J. Physiol.*, 1930, 95: 43.
2. STRICKER, P. AND GRUETER, F., *Presse Med.*, 1929, 37: 1268.
3. MUIR, R., *Text-book of Path.*, Lippincott, Phila., 1924, p. 710.
4. WAKELY, C. P. G. AND BUXTON, ST. J. D., *Surgical Pathology*, Wright, Bristol, 1929, p. 613.
5. THOMSON AND MILES, *Manual of Surgery*, Oxford Univ. Press, 7th ed., 1926, 3: 34.
6. BUNTS, F. E., *Practice of Surgery*, W. F. Prior, Hagerstown, Md., 1931, 5: 13.
7. DEEVER, J. B. AND MCFARLAND, J. (quoted by Bunts).
8. ROSE AND CARLESS, *Manual of Surgery*, 11th ed., J. F. Hartz, Toronto, 1924, p. 1058.
9. CRILE, G. W., *The Journal-Lancet*, 1931, 51: 99.
10. LEE, B. J., *Arch. Surg.*, 1931, 23: 85.

Case Reports

TRAUMATIC PNEUMOCEPHALUS

By J. S. SMITH, M.D. AND
P. H. MALCOLMSON, M.D.,

Edmonton

P.F., male, white, aged 30, was admitted on January 8, 1933, for an accidental gunshot wound of the head inflicted with a .25 bullet.

The patient was conscious. Blood and brain substance were oozing from the point of entry to the right of the bridge of the nose.

The wound was cleaned, lightly packed, and the patient sent for x-ray examination (Fig. 1). On the same day the bullet was removed through a small scalp incision.

January 9th.—The general condition of the patient was good. Examination showed exaggerated reflexes in the left forearm and partial paralysis of the whole of the left arm. From January 9th to 30th the progress was uneventful and the weakness of the left arm had almost

completely disappeared. However, there was persistent oozing of cerebrospinal fluid through the wound of entry, particularly when the patient was sitting up, and on coughing or sneezing. At this time severe headache developed and a second x-ray examination was requested. In the radiological department it was noted that when the patient was in the prone position, cerebrospinal fluid drained very freely from the wound of entry. The films (Fig. 2) showed a large air-filled cavity in the right frontal lobe. The temperature remained normal, and, except for severe headache and drainage of spinal fluid from the nose, the condition of the patient remained good.

X-ray films taken on February 13th showed an increase in the size of the cavity in the right frontal lobe and, in addition, both lateral and also the third ventricles to be filled with air. This demonstrated that a fistula had developed between the original brain lesion and



FIG. 1.—Bullet over the posterior portion of the right parietal bone: a fracture through the right frontal sinus.



FIG. 2.—Shows a large air-filled cavity in the right frontal lobe.



FIG. 3.—Shows the fistula between the original brain lesion and the right lateral ventricle.

the right lateral ventricle. (Autopsy proved this to be correct, Fig. 3).

On February 15th the patient developed a septic type of fever, became irrational, and his general condition rapidly became poor. Surgical interference was suggested, but was decided against as he was not in condition to stand any operative procedure.

Synopsis of the autopsy.—Purulent basal meningitis. In the right frontal lobe was a large, smoothly lined cavity filled with clear fluid. This cavity communicated with the right lateral ventricle through a tiny fistulous opening.

Dandy, in 1926, gave a very complete summary of the literature with three case reports. So we shall merely mention some of the important points concerning this interesting condition. The first case was reported in 1884 by Chiari, and was due to chronic infection of an ethmoid with a resultant fistula through the dura into the corresponding frontal lobe. Several cases were reported in Germany during the War. All these were due to gunshot wounds, the air entering the brain through a fracture of one or other of the para-nasal sinuses. An occasional case due to gas-bacillus infection is found at autopsy.

The frontal intracerebral type of pneumocephalus is the most common and is usually due to fracture through the frontal sinus. Its more frequent occurrence in this region is explained by the anatomy of the part. The dura here is closely attached to the bone, and also the tip of the frontal lobe lies near the bone; consequently, with fracture of the frontal bone,

the dura is easily torn and the brain damaged. Now in order for the air to enter the brain the pressure in the sinus must be increased by sneezing, coughing, etc. The destruction of the white matter is caused by the explosive entry, the irritating quality of the air, and the fact that the brain has already undergone trauma with resultant softening. As in the case reported, the arocele may eventually communicate with the ventricular system by breaking through into the lateral ventricle of the same side. Rarely, this may take place by way of the subarachnoid space through the foramina of Magendie and Luschke.

Forty-three cases are reported to date. The diagnosis is made on symptoms of increased intracranial pressure—headache, vomiting, etc.; sneezing or coughing, followed by cerebrospinal rhinorrhœa; and the x-ray findings.

All cases with fracture through sinuses should be suspected.

Death is due to increased intracranial pressure, or to meningitis induced by infection from without. Dandy estimates the mortality to be 50 per cent in untreated cases, and suggests operation to close the rent in the dura. Grant suggests that if the intracerebral air shows no increase in extent the patient may be better off if left alone, as known cases have cleared up spontaneously.

BIBLIOGRAPHY

1. DANDY, W. E., *Arch. Surg.*, 1926, 12: 949.
2. GRANT, F. C., *Surg., Gyn. & Obst.*, 1923, 36: 251.
3. GREY, H. M., *Brit. M. J.*, 1930, 2: 562.
4. KESCHNER, M. AND LANDER, J., *J. Am. M. Ass.*, 1933, 101: 24.
5. MILLER, S. W., KLEMMER, R. N., SNOKE, P. O., *J. Am. M. Ass.*, 1931, 96: 172.
6. SPILLER, V. G., *Med. Clin. of N. Am.*, 1921-22, 5: 651.
7. TAFT, R. B., *Am. J. Roent.*, 1931, 25: 800.
8. TEACHENOR, F. R., *Ann. Surg.*, 1923, 78: 561.

LUETIC RETROBULBAR NEURITIS

BY BENJ. H. HARRY, M.D.,
Oculist to the British Columbia
Mental Hospitals,

Vancouver

The following case report is submitted for the purpose of pointing out the necessity of looking beyond the spheno-ethmoid area and disseminated sclerosis for the etiology of this ophthalmic condition. In my opinion this case conforms more to the peripheral than the axial type of this affection.

Briefly stated the following were the clinical features. A man, aged 30, whilst at work, noticed that his vision was rapidly failing, until it had diminished to almost complete blindness within the next 24 hours. He was admitted to a general hospital, but owing to his becoming mentally confused and disconnected in his speech he was committed to the mental hospital. At the latter hospital he gave a history of having been in poor health for the past year, although he continued at work. He was pale and emaciated, had poor use of his legs, and had a

positive Romberg sign. The tendon reflexes were absent. His vision was so poor that he could not see where he was going, and he kept bumping into objects. He stated that he could see things dimly in front of him, but could see nothing off to either side of the projected visual axis. He could not see well enough for perimetric examination, but by the cruder methods it was obvious that he was merely looking dimly through two key holes. Argyll Robertson pupil was present. The spinal fluid and blood Kahn tests were both positive. The spheno-ethmoids showed no disturbance with x-ray. The man was in hospital two weeks before it was deemed safe to start him on specific treatment. During the subsequent six weeks he was given fourteen intramuscular injections of thio-bismol, gr. 3. Following this series he showed some improvement, mentally, physically, and ophthalmically. He was then given malarial injection, and after having eight good chills these were interrupted with quinine. No active medication was administered for the following two months, when he was again given "thiobismol", with every other injection accompanied by an intravenous injection of tryparsamide. However before each series was started he was examined both ophthalmoscopically and by perimeter (see charts dated as above). It should be stated that at the time of his admittance the ophthalmoscopic picture was negative, with the exception of a small amount of hyperæmia of the left nerve head. Upon completion of this series he was sufficiently recovered to leave the hospital, had good use of his limbs, talked rationally, and his vision had improved to O.D. 20/100 and O.S. 20/50. As he was a compound myope vision was further improved to O.D. 20/30 with -1.25 c -1.100 x 110 and the O.S. to 20/25 with -1.00 c -50 x 90. This recovery of central vision was not accompanied by a corresponding enlargement of the peripheral field as shown by the perimeter charts of October, which show quite a remnant of peripheral atrophy.

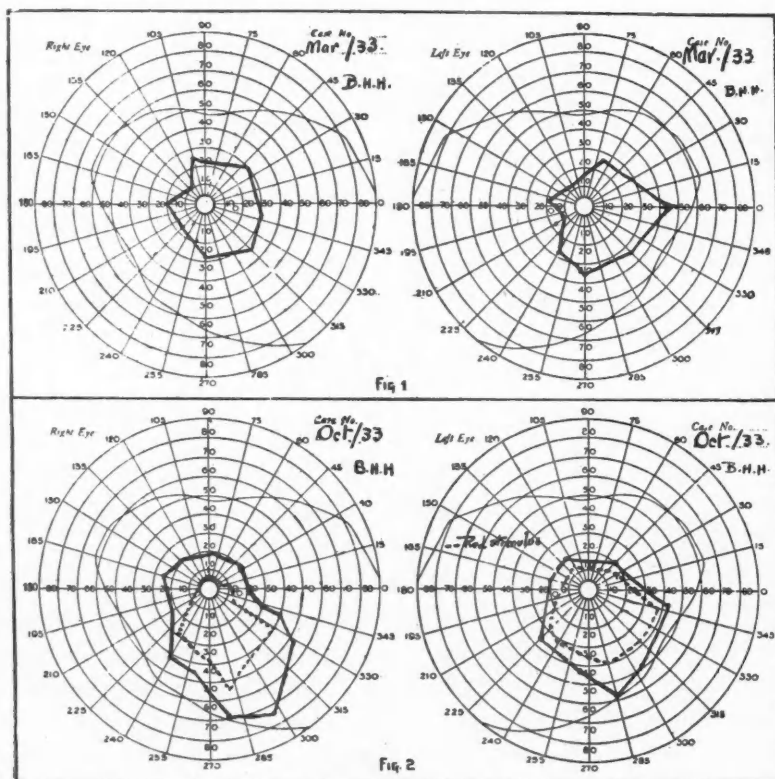


FIG. 1.—First reliable tracing. Previous to this the patient had to grope around; 10 mm. white stimulus. Generalized contraction of fields, due, in all likelihood, to peripheral congestion of optic nerve incidental to toxic (luetie) cerebrospinal fluid.

FIG. 2.—With intensive treatment the vision has greatly improved, the fields have enlarged, and, clinically, the patient is recovering. Perineural congestion lessened. No scotomata, either absolute or relative.

A CASE OF UNDULANT FEVER SIMULATING ACUTE RHEUMATIC FEVER, WITH ISOLATION OF *BRUCELLA ABORTUS* IN HÆMOCULTURE*

BY JOHN T. TWEDDELL, M.D. AND
KENNETH B. SCHLOTZHAUER, M.D.,

Ottawa

The diagnosis of undulant fever from a clinical point of view alone is difficult. The serological and skin sensitivity tests have aided greatly, but the actual isolation of the causal organism from the blood stream in human cases has been a difficult matter. The following case is reported as an unusually typical and interesting case.

CASE REPORT

A.H., 32 years of age, was admitted to the Ottawa Civic Hospital on October 27, 1933, complaining of sore throat, general malaise, pain in the left chest, and pain in the right knee, of one week's duration.

History of illness.—The patient apparently took ill one week prior to admission. He had taken up quarters at the relief camp, and the first day there slipped and wrenched his right knee. He was excused from duty for two days, and at the end of that time complained of pain in the back and legs, headache, slight cough, sensations of chilliness and fever. With these complaints he was admitted to the relief station hospital. After a week in bed he showed no improvement and was sent into this hospital with a temperature of 103.4°; pulse 120; and respirations 22.

Personal history.—He had not had the usual childhood diseases, but suffered an attack of pleurisy in 1928. He had had a varied career since discharge from the army. He lived in Mexico for the past year, and hiked from Mexico to Ottawa, arriving here in August, 1933. During his trip he was exposed to extremes of weather, and his diet consisted of anything he could easily obtain. To his knowledge he claims he never had goat's milk, but had taken raw cow's milk.

Physical examination revealed a young man not acutely ill, somewhat emaciated, resting comfortably in bed. The throat was acutely inflamed; the right knee was quite painful on

movement. Apart from this, examination was negative. The laboratory findings on admission were as follows: Red blood count, 3,900,000; white blood count, 6,500; hæmoglobin, 65 per cent; slight secondary anæmia. Throat swabs gave a pure culture of *S. viridans*. The sputum was negative for tubercle bacilli. The blood chemistry and x-rays of chest were normal.

On the basis of the temperature and joint symptoms a diagnosis of rheumatic fever was made, and treatment was instituted in this direction. The patient, however, showed only slight improvement. He complained of sweats that came on about 4 p.m. each day. The temperature would rise shortly after, reaching a maximum of 102 to 103°F. at 8 p.m., remaining up until the following morning. He seemed to be losing ground steadily, and the response to salicylates was negligible. The blood picture remained much the same, although the anæmia was more marked. His appetite became very fickle, and his dietary régime became a problem, as he was steadily losing weight. The pain in the right knee had disappeared, but migratory pains in the opposite leg, shoulders and elbows followed.

On November 22nd, the patient's spleen was definitely palpable and slightly tender. A white blood count at this time was 6,000 and the agglutination test was positive 1:1,600 for *Br. abortus*. The blood culture showed a growth after four days, a pure culture of *Br. abortus* being obtained. Blood cultures were repeated five days and thirteen days later, and similar results obtained. Serologically and culturally, the strain belonged to the bovine type and it so clearly fell within this group that little doubt existed as to its true nature. A diagnosis of undulant fever was made. The treatment was symptomatic, in the main directed towards maintaining the patient's nutrition.

The routine method of performing blood cultures in this hospital is as follows. Douglas broth of pH 7 and 7.5 is put up in 6 ounce bottles fitted with bakelite screw caps. In autoclaving, the bottles containing the broth are put in uncapped, the caps being sterilized separately. Immediately after autoclaving the caps are applied and the broth stored in the refrigerator. At the time of blood culture the bottles are put in water at body temperature; the blood is then obtained, the mouth of the bottle flamed, the blood inserted, and bottle and caps are again

* Received for publication on March 20, 1934.

flamed, sealed and incubated for a minimum of 6 days at 37.5°C. This method provides partial anærobic conditions and has been found to enhance the growth of organisms of a partially anærobic nature.

This case was characterized by:— (1) a daily pyrexia, the rise beginning at 4 p.m., reaching its maximum at 8 p.m., with a pulse not proportional to the degree of temperature; (2) an enlarged, tender, and palpable spleen; (3) migratory joint pains simulating acute rheumatic fever; (4) secondary anæmia; (5) positive ag-

glutinations against *Br. abortus*, beginning at titres of 1:10 and reaching 1:1,600; (6) the isolation of the organism from the blood stream on several occasions.

Our thanks are due Drs. R. S. Stevens and T. R. Little for their kindly assistance in this case.

REFERENCES

1. KULOWSKI AND VINKE, *J. Am. M. Ass.*, 1932, 99: 20.
2. YECKELL AND CHAPMAN, *J. Am. M. Ass.*, 1933, 100: 23.
3. TURTON, *Brit. M. J.*, 1932, 1: 1029.
4. GODDARD, *Brit. M. J.*, 1932, 2: 672.
5. FAIRWEATHER, *The Lancet*, 1932, 1: 613.
6. DALRYMPLE-CHAMPNEYS, *The Lancet*, 1932, 1: 791.
7. DOOLEY, *Arch. Internat. Med.*, 1932, 50: 373.

Editorial

THROMBOCYTOPENIA AS A MANIFESTATION OF POISONING

THE occurrence of purpura, cured permanently, or relieved for more or less prolonged periods, by splenectomy or tying the splenic artery, is always an arresting phenomenon, one which invites investigation and speculation. In these cases the essential feature is a diminution in the number of the blood platelets (thrombocytopenia) to a point somewhere below the lower norm of 30,000 per cubic millimetre. The operation of splenectomy is followed by a rapid and striking increase in the number of the platelets and the hæmorrhage stops. Kaznelson,¹ who was the first to try this procedure, was of the opinion that the deficiency in the circulating platelets was due to an abnormally active destruction of the platelets in the spleen, as he found large masses of platelets in a state of disintegration in that organ. While this observation has been confirmed in some cases it has not been substantiated in by far the majority. There is more evidence to support the opposing view of Frank, that the essential cause lies in a faulty development of the megacaryocytes in the bone marrow. How the operation of splenectomy produces such beneficial results is quite a puzzle. Waugh² believes that the changes following splenectomy are not specific for thrombocytopenia, in as much as they occur also after the removal of the normal organ in conditions

other than that in question. He says, "Personally, I now look upon the beneficial effects of splenectomy in this condition (thrombocytopenic purpura, Ed.) as due to quite independent changes, which, fortunately, tend to correct the abnormalities which are present but in no way strike at the root of the disease. Moreover, while one cannot deny the histological abnormality of the megacaryocytes, the rapid production of platelets following excision of the spleen precludes any conception of more than a very simple injury or, perhaps better, inhibition."

It is well to point out, however, in considering this matter, that there are two main groups of thrombocytopenias:—(1) primary, idiopathic, or essential thrombocytopenia, of which Werlhof's disease is the most outstanding example; and (2) secondary or symptomatic thrombocytopenia. In the first no definite cause can be incriminated; in the second the causes are many and various, but have this in common that they all act deleteriously on the bone marrow. Perhaps the latter may be divided into three categories: (a) toxins, this term being used in a wide sense, (b) primary blood diseases, and (c) conditions in which the bone marrow is destroyed and replaced by other tissues. The toxic causes are exemplified occasionally in the course of certain of the acute infectious diseases, such as, scarlatina, measles, smallpox, diphtheria, typhoid fever, typhus, cerebrospinal fever and sepsis; in chemical

1. KAZNELSON, P., *Wien. Arch. f. inn. Med.*, 1923, 7: 87.
2. WAUGH, T. R., The Classification of the Hæmorrhagic Diatheses, *Canad. Med. Ass. J.*, 1931, 25: 331.

poisonings, as from arsenicals, bismuth, iodine, gold and benzene, which according to the degree of severity and specific action on the marrow are manifested as agranulocytosis, aleukia hæmorrhagica, aplastic anæmia and panmyelotoxicosis. The primary blood diseases that come into thought are Addisonian anæmia and the leukoses. The conditions which may cause replacement of the bone marrow are such things as carcinoma, lymphogranulomatosis, Gaucher's disease, Neuman-Pick disease, and osteosclerosis. It may properly be emphasized that before any procedure so drastic as removal of the spleen is undertaken in any given case of thrombocytopenia it should first be determined into which of the two groups the case falls. Every effort should be made to establish a cause, which, naturally, should be removed if possible. If no extrinsic cause can be ascertained splenectomy should be considered; then, and only then. If decided upon, the operation should be preceded by blood transfusion.

Much attention has been given of late to the subject of the harmful action of such drugs as amidopyrine, members of the barbituric acid series, dinitrophenol, and their congeners. Cases of fatal poisoning have been recorded which have been attributed to one or more of these agents. In some the clinical picture known as agranulocytosis or granulocytopenia has been manifested, and much evidence has been accumulated to show that this is due to the action of the common benzene radicle on the bone marrow.

Similarly, purpura, with thrombocytopenia, has been noted following the employment of certain other of the new hypnotics. Thus, Morawitz³ records the occurrence of "purpura Majocchi", polycythæmia, and, later, slight thrombocytopenia after the use of acetyl-adalin, and Jones and Jacobs⁴ had a case in which the use of nirvanol was followed by severe thrombocytopenic purpura. Again, in a quite recent communication, Dr. F. E. Loewy⁵ reports the occurrence of a typical case of Werlhof's disease and two milder cases of thrombocytopenic purpura which were due to the prolonged administration

of a well-known hypnotic, "sedormid," in hypersensitive patients. "Sedormid" is allyl-iso-propyl-acetyl-urea. The first patient, a man aged sixty-one, had been taking sedormid in doses of four to eight grains frequently during the preceding three years. His illness was characterized by the appearance of purpura, ecchymoses, severe bleeding from the gums after the extraction of a tooth, hæmaturia and melæna. The bleeding time was prolonged over many hours and the blood platelets numbered 22,000 per cubic millimetre. A transfusion of 600 c.c. of citrated blood produced marked improvement, and two days later the platelets were 120,000. The administration of eight grains of sedormid on three successive nights brought on thrombocytopenia again. The condition improved when the sedormid was omitted, and six days later the platelet count was 360,000. As an experiment, four grains of the drug were then administered, with the result that purpura reappeared and the platelets were reduced to very few (in one smear). In a week the count was normal again. Ten days afterwards a second test was made. Two grains of sedormid produced another attack of purpura in which the platelets were reduced to 17,000. Two weeks later the platelets numbered 347,000. "The case against sedormid was proved."

The second patient, a woman of sixty, had taken with good effect sedormid in doses of two to eight grains nightly for several weeks rather more than a year previously. For five and a half weeks before being seen by Dr. Loewy she had again taken 4 to 8 grains of sedormid nightly. One week after resuming the medication she developed purpura, extravasations of blood, retinal hæmorrhages, arthritic pains, and headache. Her bleeding time was markedly prolonged (over eight minutes), the tourniquet test was positive, and the platelets numbered 28,000. The sedormid was stopped, improvement set in, and a week later the bleeding time was normal and the number of the platelets was normal.

The third patient was a woman, aged fifty-one, who complained of bleeding from the gums which had come on a few hours after a sedormid tablet had been taken. Numerous purpuric spots were also present on the trunk and legs, but at the time of

3. MORAWITZ, P., *Deutsche med. Wchnschr.*, 1932, 58: 375.

4. JONES, T. D. and JACOBS, J. L., *J. Am. M. Ass.*, 1932, 99: 18.

5. LOEWY, F. E., *The Lancet*, 1934, 1: 845.

examination she was somewhat improved. The bleeding time was normal, the tourniquet test negative, and the platelets were 36,000 per c.mm. This patient had taken sedormid in doses of two to four grains repeatedly during the previous year and had had during that time several attacks of purpura, and, once, a small retinal hæmorrhage. When the sedormid was stopped no further hæmorrhages occurred.

In commenting on these cases, Dr. Loewy remarks that in regard to the harmful effect produced by the prolonged administration of drugs it is necessary to distinguish (1) a direct toxic effect due to overdose or accumulation characteristic and specific for each drug; (2) a purely allergic effect, identical, *e.g.*, with serum sickness; and (3) an allergotoxic effect, where an over-dose can be excluded and the peculiar effects must be attributed to a gradual sensitization of the patient. He explains his cases on the last assumption. He concludes that "the modern hypnotics and sedatives are certainly valuable but never absolutely harmless, and careful supervision is required, especially with newly introduced drugs and hypersensitive patients with irritability of the digestive tract."

It is quite evident that the two most

popular groups of sedatives, the barbituric acid series and the ureids (acetyl-adalin; sedormid), are competent, on occasion, to give rise to serious toxic disturbances, which may even threaten life. In both cases marked changes in the constitution of the blood are to be found; in the first, granulocytopenia, in the second, thrombocytopenia. In both cases skin rashes may appear; in the first, of urticarial type, in the second, purpura. While this is a generalization that may be admitted, it should be noted that one of the barbituric acid series (nirvanol) has been found to cause purpura. There may, therefore, be a common meeting ground. In the study of cases of granulocytopenia and thrombocytopenia investigation of the number and quality of the blood platelets should always be undertaken, for, by so doing, the relationship, if any, between the two conditions will be made clearer. In the recent literature on granulocytopenia this matter seems to have been overlooked. In determining the part played by the benzene radicle, which is at present under suspicion as the common toxic agent in causing certain of the cases of granulocytopenia, the point is of some importance. The benzene radicle is present in the barbituric acid groups, but is absent in the ureids.

A.G.N.

CHANCE AND THE BLOOD COUNT

"SUPPOSE we have a patient suspected of acute appendicitis, whose differential count of 100 cells shows 70 per cent of polymorphonuclears, and an hour later, 80 per cent. Is this a significant change, or may it be due entirely to chance variation?" These sentences are quoted from a recent article by Barnett¹ on "The Unavoidable Error in the Differential Count of the Leukocytes of the Blood". It is a curious fact that, at this stage in the history of blood counting, an article of that kind should still be required in order to explain to laboratory workers and clinicians how to make allowance for the "chance" errors in the differential count.

If two differential counts are made on the blood of the same person at different times, everyone recognizes that the difference be-

tween the counts may be due to: (a) actual differences, physiological or pathological, in the person's blood; (b) differences in the observer or his technique. It does not seem, however, to be so clearly realized that a difference between the two counts should be expected even if the blood had exactly the same proportions of cells on the two occasions, and even if the technique and the observer's reactions were perfect. An argument by analogy may elucidate the point. Let it be supposed that many thousands of coins are tossed on to the floor and then picked up two at a time, purely at random, that is, without being previously looked at and so as not to give special preference either to those with head uppermost or to those with tail uppermost. If there is on the floor an exactly equal number with head up and with tail up, an average sample of two coins will

1. BARNETT, C. W., *J. Clin. Invest.*, 1933, 12: 77.

show this also, but no one will be surprised if some of the samples show two heads or two tails. The differences are unavoidable, and are called "variations due to random sampling". Exactly the same kind of variation is to be expected in differential blood counting, even if the actual proportion of cells remains constant and if the technique is perfect. Hence, before taking account of other factors, it is surely desirable to know how far the differences between counts can be attributed to variations in random sampling. The methods that give the answer to this question are statistical methods, and Barnett's paper illustrates the use of certain of these methods in the differential blood count. Now all medical science, carried on by the bedside or in the laboratory, is based on sampling of one kind or another, and where samples of blood, urine, bacteria, drugs, animals or anything else are taken, random sampling variations are met in addition to any other variations that may be present. It is all the more remarkable, therefore, that statistical methods are still looked at askance by a number of medical scientists and are completely ignored by many clinicians. Anyone who cares to apply elementary statistical tests to medical literature finds himself agreeing in substance with the verdict of Dunn², who, in 1929, reported that out of 200 quantitative medical-physiological papers in current American periodicals over 90 per cent required statistical methods and did not use them, and that in almost 40 per cent conclusions were drawn which could not have been proved without setting up adequate statistical control. Medical research does not in this respect compare very favourably with agricultural and industrial research.

Our most exact knowledge of pure random sampling is based on our experience of coin-tossing and dice-throwing. In the coin-tossing experiment just referred to, whenever we take up a coin at random we have an equal chance of taking one with the head up and one with the tail up. If we take them in samples of two at a time we shall expect the following possibilities:—

Head-Head	Head-Tail
Tail-Head	Tail-Tail

This shows that the average will contain a head and a tail, while two heads will occur in about one-quarter of the samples, or, in other words, the chance of finding such a sample is one in four. As the numbers of the samples become larger, this method of writing out the possibilities becomes increasingly tedious and mathematical methods are employed. It must be noted, however, that these methods do not involve any further hypothesis regarding the phenomena themselves. The mathematical methods are merely tools. By means of them, tables are prepared which are applicable to the larger samples, and they can be applied to blood sampling as well as to any other sampling, for it must be remembered that the statistician does not claim to teach the medical man about blood cells as blood cells, but as objects liable to random sampling variation.

Let it be supposed, for example, that the polymorphonuclears and the non-polymorphonuclear leucocytes are present in the blood in equal numbers, and that a number of drops are taken and on each drop a differential count of 100 cells is made. The tables can be used to show what variations are to be expected solely as a result of random sampling, apart altogether from variation due to technique or other causes. Random sampling will account in this case for results varying between the limits 35 per cent and 65 per cent polymorphonuclears. A single line of calculation with a glance at the appropriate table is sufficient to show this. Again from random sampling variation, 5 per cent of the samples will give counts either below 40 per cent polymorphonuclears or above 60 per cent, and about one-third of the samples will give counts of below 45 per cent or above 55 per cent polymorphonuclears. Barnett's experiments, designed to eliminate all but random-sampling variations, gave results that agree with these limits.

These data and the tables referred to so far are concerned with phenomena in which the chances for and against are equal (*e.g.*, 50 polymorphonuclears to 50 non-polymorphonuclears), but investigations have shown that the same kind of calculations and the same tables can be used without serious error where the chances of meeting the two types of cells are not equal, *e.g.*, where in the total

2. DUNN, H. L., *Physiol. Rev.*, 1929, 9: 275.

blood there are 70 polymorphonuclears and 30 non-polymorphonuclears or 10 monocytes and 90 non-monocytes.

An extension of the same principle of random sampling enables one to solve the problem quoted at the outset of this article. The most useful method developed for this purpose is called the chi-square method. This method answers the question: If the differences of 70 per cent and 80 per cent in the quoted instance were due solely to random sampling, how often would you expect to meet differences of such a size? A minute's calculation gives the chi-square value, and this, turned up in the published tables, shows that we should expect to meet such differences due to random sampling in 1 out of 10 cases. If 200 cells had been counted and the same difference found, random sampling would account for it in only 1 out of 50 cases. Such are the answers given by statistical tests. It should be clearly realized that the tests do not claim to show that random sampling was or was not responsible in any given case. They do not set out to establish causes. If the clinician or laboratory worker using the tests thinks that random sampling variation will, for his purposes, sufficiently account for the results, then he need not be concerned with other sources of variation, such as technique, which would always tend to increase the

variation. But this decision is left in the hands of the one who is investigating. It is not dictated by the statistician.

The way to a more adequate understanding and treatment of medical data would be opened up if all records, articles, and even abstracts gave, besides averages, the numbers of observations and the variation, properly expressed, *e.g.* as standard deviation (maxima and minima being very unreliable). Still further progress would be made if some fundamental ideas were more clearly understood, namely, that the principles underlying statistical methods are relatively simple, that the commonest methods are easy to learn, that the methods can be used as an instrument without a deep knowledge of their mathematical structure, that the methods do not impart a fictitious accuracy or an artificial quality to the results, and that these methods tend very often to show that conclusions are not so definite as the unaided observer would think they were. If these things were understood, the methods would be much more commonly used, and, more important still, workers would come to recognize when they should appeal to the statistician. This in turn would hasten the coming of the day when a consultant statistician will be considered necessary in every medical centre.

DONALD MAINLAND.

Editorial Comments

The Late Dr. F. N. G. Starr

In the death of Dr. F. N. G. Starr, of Toronto, the medical profession in Canada has lost one of its ablest surgeons, and one whose reputation stood high not alone in his own country but also in the United States and Britain. In the early years of this century he was the Secretary of the Canadian Medical Association, and established an enviable record in that capacity.

Doctor Starr's surgical career in Toronto is too well-known to need comment here. His genius was essentially clinical. As a handicraftsman he was everywhere recognized as being particularly expert. His operations were models of clear planning, quietness, and rapid work. As a practitioner of surgery he was beloved by his patients, and he had one of the largest surgical practices in the Dominion. As a teacher he followed the best traditions of the English school. A number of his clinical lectures were published in this *Journal*, and of their kind they

were models. The various honours that he received, both in this country and in Britain, are sufficiently described elsewhere—these things are for the public ear—but in the minds of his surgical friends and colleagues Doctor Starr's character was a matter for more intimate and deeper appreciation. We all knew that his unquestioned surgical ability went hand in hand with an unquestioned surgical honesty. In social and medical life he had his dislikes as well as his likes, and both were strong. Perhaps at times, in the matter of his dislikes, he spoke too freely; perhaps that was a fault; yet that tendency to a certain censoriousness of speech towards some was far outweighed by a similar freedom of generous and eulogistic speech towards others—many others! We remember him also for his humour, which was unflinching. Above all, he was kind, considerate, and particularly generous towards all the sick who sought his help.

E. W. ARCHIBALD

Hospital Sweepstakes

Once more Ottawa has been asked to consider hospital sweepstakes, and again the measure has been defeated, although there is some indication, particularly in the Senate, that this suggestion for the raising of funds has ardent supporters. In these days of financial stringency our hospitals, with their constant deficits, can well utilize any available funds, but there does seem to be some difference of opinion concerning the wisdom of this proposal. Strong arguments have been advanced by the proponents of sweepstakes. Attention is drawn to the large sums of money which now go to foreign sweepstakes; if these funds could be diverted to Canadian hospitals much benefit would follow, particularly as the sale of tickets would likely increase enormously. It is pointed out also that a "sweep" would enable "the man on the street" to share some of the burden of hospital support now borne by the taxpayers and the generous few. The question of provincial rights has been raised, and in reference to the moral aspect of the matter it is pointed out that church lotteries and stock market gambling are now legalized anyway and that this measure would only extend this principle. On the other hand, those who doubt the wisdom of this method of finance call attention to the fact that the sweepstake plan is a most expensive way of raising funds. The Irish hospitals have obtained but about 22 per cent of the money raised, nearly 80 per cent of the subscriptions being dissipated in prizes, salaries, commissions, and government percentages. Moreover, the remarkable success of the Irish venture has been largely because of priority in the field and the lack of serious competition in English-speaking countries. Were all provinces in Canada to authorize sweepstakes, and were all hospitals to participate, the net amount available to each of the 893 hospitals, or to each of the 500 public general hospitals, would be very small indeed. Moreover, of the greatest concern to hospitals here would be the likely repetition of what has happened in Ireland and elsewhere—the almost complete cessation of private philanthropies and subscriptions. One could anticipate a revision downwards of governmental and municipal grants, and hospital workers express grave concern over this possibility. Also it is emphasized that the sweepstake method of raising funds has a definite moral aspect. While stock markets and pari-mutuels are legalized, that in itself does not seem to be a logical argument for legalizing another evil. Social workers refer to the number of people on relief using their relief funds or "panhandling" to purchase a ticket. Senator Graham was of the opinion in the Senate that the lottery destroys the citizen's sense of civic responsibility, and breaks down the moral fibre of the individual. Referring to the prize-winner himself, he said "Those opposed to lotteries can

truthfully cite hundreds of cases of men who won cash prizes, got drunk, beat their wives, eloped with demi-mondaines and finally died penniless." Perhaps, however, most of us would take a chance on such an inglorious ending.

What is the opinion of the hospital workers on this matter? As *The Canadian Hospital* recently observed, "It is interesting to note that with all this solicitude for hospital welfare on the part of new-found friends, the hospitals themselves do not seem to have been consulted. Are the hospitals but being made the foil to mask an ultimate demand for the legalization of all sweepstakes?" Here again opposing views may be found, but it is worthy of note that the Canadian Hospital Council, a body representing all of the twelve hospital associations in Canada, went on record at its 1933 meeting in Winnipeg as being opposed to the principle of financing hospitals by the sweepstake method. The British Hospital Association has also definitely rejected the proposal, and the Commission appointed by the British Government reported adversely on the plan. The director of one of our leading general hospitals would entertain the proposal only on the basis that the government assume complete control of the lottery, minimize expenses, reduce prize appropriations and use the funds to supplement their present financial support to hospitals and other charitable institutions.

HARVEY AGNEW

The Introduction of the Fish Tapeworm into Canada

Some little attention has been given in a recent issue of the *Journal* to the subject of infestation with the fish tapeworm, particularly in regard to its appearance in eastern Canada.¹ It would be of interest to find out the earliest date when the *Diphyllobothrium latum* was first introduced into America. Fish tapeworm seems to have been met with in the United States in 1879, when a case of infestation, identified by Professor Leidy, was reported by Walker² in a Swede who had been in the country about two months. The first case occurring in America in a native who had not been out of his own country was reported by Dr. W. F. Hamilton, of Montreal, in 1901.³ Dr. Daniel Nicholson, of Winnipeg, in an informative article,⁴ states that the first mention of a tapeworm in the records of the Winnipeg General Hospital was in 1892 but the species is said to have been *Tenia solium*. Ten cases of fish tapeworm are recorded in 1924-26 and five in 1927. It is generally held that this worm was introduced into Manitoba by foreign immigrants from Minnesota, and also, directly, by Finns and Scandinavians haling from dis-

1. *Canad. M. Ass. J.*, 1934, **30**: 377 and 425.

2. WALKER, J. T., *Phila. Med. Times*, 1879, **9**: 326.

3. HAMILTON, W. F., *Montreal Med. J.*, 1901, **30**: 350.

4. NICHOLSON, D., *Canad. M. Ass. J.*, 1928, **19**: 25.

tricts bordering on the Baltic Sea. Doubtless, this introduction accounts to a large extent for the rather rapid extension of this form of parasitic infestation, but there is evidence for thinking that the fish tapeworm was existent in Manitoba even before this. We are indebted to Dr. Ross Mitchell, of Winnipeg, for the following extract taken by him from the Report of the Palliser Expedition, which is in the Provincial Library. He refers to the subject as follows, in an article on Sir James Hector.⁵ "In entering what is now Manitoba the expedition arrived at Fort Alexander on July 8, 1857, and the leader made this note: 'At 6.15 p.m. we arrived at Fort Alexander, which stands on the left bank of the river Winnipeg about a mile and a half from its mouth. Here Dr. Hector found a great many patients all suffering, more or less, from symptoms of intestinal worms caused by exclusive fish diet. The catfish (*Siluris felis*) is plentiful here, the liver of which abounds with an oil which might be successfully substituted for cod liver oil in the treatment of consumption which is rife here'."

We wish we could have had more information, but it is clear that the medical men attached to these early pioneering expeditions were keen observers and jotted down many observations than can give us clues even at the present day. The catfish (barbot) is now recognized as a frequent host of the *Diphyllbothrium latum*.

A.G.N.

5. MITCHELL, R. B., *Manitoba Med. Bull.*, Nov., 1932.

The Review of Gastroenterology*

The first number of a new journal, *The Review of Gastroenterology*, has come to hand. It is the organ of the Society for the Advancement of Gastroenterology, and will cover the subject of proctology as well as gastroenterology. Dr. Samuel Weiss, 146 Central Park West, New York, is the editor and the periodical will be published quarterly. This is not the first time that an attempt has been made to launch a journal devoted to gastroenterology but previous ventures have been short-lived. In spite of the fact that medical journals are legion—too numerous, as many of us think—the editors of the new Review feel that their publication has a place, as, no doubt, it has. It is, of course, desirable that when special information is sought it should be obtainable in one place, rather than in many. But besides this, the general practitioner, the specialist in other lines, the surgeon, and the laboratory worker may, on occasion, find such a journal of practical service, and it is one of the aims of this new journal to meet this want. It is the intention of the editors to build up an extensive system of abstracts, so

* The subscription price is \$2.00 (\$3.00, foreign) and the journal can be obtained at 148 Lafayette Street, New York, N.Y.

that their production will represent the best thought of the day and be of material assistance in diagnosis and treatment.

This, the first number, is planned so as to give an idea of the amount and character of the ground which it is intended to cover in the future. It is, therefore, of a comprehensive character. There are articles on the history of gastroenterology, on the physiology of the stomach and upper intestinal tract and of the liver and gall bladder. There is an article on "The physician's legal duty to a patient". There is an article entitled "Ways of discovering the foods that are causing indigestion" by Dr. Walter C. Alvarez, and an experimental research by Drs. Ehrenfeld and Sturtevant on "Tobacco sensitivity in peptic ulcer". Besides these there are editorials on "Specialism", "Gastrointestinal radiography", "Hydrochloric acid formation", "A roentgenological problem in gastroenterology", "Radiotherapy", and "A pharmaceutical racket". There are fairly numerous abstracts from general and special journals covering surgery, roentgenology, physiotherapy and allergy as related to gastroenterology, as well as gastroenterology proper. It is planned to make these even more complete in time. There are book-reviews on nutrition, dietetics, physiotherapy and gastric anacidity. The field seems to be well covered, and if the design of the Editorial Board is carried out the new journal should be of great value in its special field and even beyond it.

A.G.N.

On Bibliographical References

With the July issue of the *Journal*, which initiates a new volume, the Editorial Board has decided to make certain changes in the manner of recording bibliographical references. This is done with the idea of making these references more valuable to our readers and to facilitate indexing. We would request our contributors, therefore, to be good enough to furnish us with complete information in this regard. The name of the author referred to, his initials, the title of his paper, the name of the periodical in which his paper appeared, the year, the volume number, and the page number should be detailed, in the order given. Thus:—

Doe, J.: The Ethics of Advertising. *Canad. M. Ass. J.*, 1934, 30: 186.

In the *Journal* the name of the periodical concerned is printed in italics and the volume number appears in bold-face type. This makes the whole reference clear and easily read. Abbreviations are always a difficulty, but contributors need only concern themselves to give the title of the periodical in full and the editors will attend to the desirable abbreviation. The editors, further, earnestly request that contributors will see to it that the references they give at the end of their articles are complete and

accurate. Not infrequently, references are given which are found to be quite wrong. Needless to say, this gives a bad impression. Further, as it is desirable to conserve space, authors can assist in this by giving only the key references or by citing papers which contain full, up-to-date

references. It will rarely be necessary to give more than ten or fifteen. Some little latitude may be allowed in the case of research articles. Careful attention to these matters on the part of authors will greatly facilitate the work of the editors.
A.G.N.

Special Articles

ON FACTS AND THEORIES IN MEDICINE*

BY I. MACLAREN THOMPSON, B.Sc., M.B.,
CH.B. (EDIN.),

*Professor of Anatomy, University of California,
Berkeley*

Applied science is, briefly, the utilization of scientific knowledge in our attempts to tackle the problems of everyday affairs, as in engineering, navigation, agriculture, and the like; that modern medicine is largely an applied science is so obvious that we seem to be in some danger of overlooking the importance of the healing art.⁷ Scientific knowledge (including, of course, medical knowledge), seems to comprise two great categories: (a) experience—observation and experiment—facts; (b) ideas—inferences or conclusions—based upon facts. Those of us whose lives are spent in applying our knowledge to the handling of practical problems are prone to pride ourselves on dealing with nothing but "hard facts," our attitude toward general ideas, theories, and principles, often varying from good natured tolerance to undissembled scorn. My thesis, however, is that when we put our knowledge to practical use, we apply not so much experience as the ideas generated in our minds by that experience—not facts, but inferences drawn from facts. Consideration of this proposition will be facilitated by first attempting to indicate the approximate nature of facts, and of some of the principal categories of ideas to which facts give rise.

THE NATURE OF FACTS

Those interested in a philosophical discussion of the nature of facts may be referred to the admirable lectures on that subject delivered in 1931 before the Philosophical Union of the University of California.⁴ Without attempting to define a precise meaning for the word "fact", I beg to subscribe to the contention of the late Sir Clifford Allbutt² that facts are *statements of past experience*, of that which is known to have occurred, of specific observa-

tions. The point is exemplified in the following Oxford anecdote, for which I am indebted to Dr. H. R. Stolz, of Berkeley. Occasion arose to consult the certificate that a Rhodes scholar, Mr. R., had passed a certain examination. While searching for the certificate, the Master of his college came across the testimonials accompanying this gentleman's application for the Rhodes scholarship; from them he read aloud such statements as these: "Mr. R. is probably the most able young man in our university today;" "Without doubt, the future holds for Mr. R. a career of unparalleled brilliance." After reading several such, the Master asked what it was that they set out to look for; upon being told the name of the certificate, he remarked dryly: "Oh yes. Well, at any rate, *that* will be a statement of fact!" We shall content ourselves, then, with the view, philosophically inadequate, no doubt, but practically sufficient, that facts are the substance, so to speak, of past experience, and that nothing else is a fact.

Though by definition facts themselves cannot be other than true, purported statements of fact may be true or false. For example, with reference to a report on a series of cases of cancer, if the diagnostic procedures were faulty, the facts as to the proportion of cancers cured may have been other than as stated. Gilbert's usage is correct, when Pitti-Sing's corroborative chorus chants³:

Her terrible tale
You can't assail,
With truth it quite agrees;
Her taste exact
For faultless fact
Amounts to a disease.

IDEAS AND CONCLUSIONS DRAWN FROM FACTS

Though science is commonly thought of as dealing pre-eminently with facts, in truth the majority of statements made in her name, particularly in teaching, are not statements of fact, but are conclusions based upon facts. An attempt may be made to classify such conclusions, or inferences, as follows:—

1. Truths, generalizations and principles; at best these are highly reliable.
2. A series of inferences to which is attached a much lower degree of certainty than to the preceding; in ascending order of reliability these are:

* Based upon some remarks addressed to the members of the Summer Graduate Courses, University of California Medical School, San Francisco, June 16, 1932.

My indebtedness to the writings of the late Sir Clifford Allbutt is obvious.

- (a) a group including conjectures, suppositions and the like;
 - (b) hypotheses;
 - (c) theories.
3. Predictions; though philosophically doubtful, practically, these cover the whole range of probabilities.

As just mentioned, *truths, generalizations and principles* enjoy a high degree of certainty, in some instances approaching as near to absolute certainty as the human mind dare go in regard to matters outside the realm of fact. Examples: man is mortal; under normal circumstances the heart pumps blood; prolonged undernourishment is debilitating; corrosive sublimate is an antiseptic; insulin reduces the blood sugar; quinine is beneficial in malaria. Such statements differ from statements of fact in not referring exclusively to particular past experience, but in including within their scope general ideas concerning the indefinite present (in which tense they are couched) and, at least by inference, the immediate future. Hence they are not necessarily and invariably true, but most generally accepted scientific truths are true enough for practical purposes.

Such statements as, the femur is the bone of the thigh, blood poisoning is caused by bacteria, are neither facts nor truths: being merely statements (sometimes converse or circumlocutory) of nomenclature or definition; they designate no natural phenomena, but cover purely artificial matters of linguistic usage.

The nature of *conjectures, suppositions, speculations, surmises, notions, opinions, guesses, "hunches", et hoc genus omne*, is too familiar to need definition. It seems safe to say that even such ideas as these are always based upon facts, though the connection be so weak and indefinite as to be scarcely recognizable. In the case of people of superior intellectual prowess, speculations have played an important part in directing the development of science, and the value of shrewd "hunches" in clinical work is familiar to every practitioner.

A *hypothesis* is a view supported by a considerable body of factual evidence. Such doctrines as that the tonic activities of striated muscle are partly controlled through the sympathetic nervous system, or that cancer is hereditary, are, in my opinion, hypotheses at present. As in these examples, there may be a considerable body of evidence against a hypothesis, as well as for it. Many diagnostic consultations resolve into a discussion of various hypotheses as to the nature of the patient's ailment, and of the evidence for and against each.

I know of no more lucid exposition of the nature of a *theory* than this, from the pen of Sir Clifford Allbutt²:

"If . . . the observer finds his hypothesis strengthened again and again by methodical observation and experiment, and if again and again it is verified by a continually increasing number of competent observers, it ousts competing hypotheses, if any, and rises to the rank of a theory . . . A theory . . . is . . . a particular general statement which has been so widely accepted by competent persons that it holds the field. There may be conflicting hypotheses, opinions, or explanations, but a general proposition is not a theory until its ascendancy is generally granted; we ought not, therefore, to speak of two conflicting theories in one field of research."

Examples familiar to medical men are: the cell theory; the neurone theory; the theory of evolution; the chromosome theory of heredity, and its offspring, the theory of the gene; the theory that certain microorganisms and infectious diseases stand, to some extent and in some sense, in a relationship of cause and effect.

To some minds a theory is the *highest* mode of expression to which knowledge is susceptible. More important to practical thinking is an appreciation of the exclusive usage of the term "theory" to cover an extensive array of facts or phenomena. A theory never refers to a particular occurrence: the "theory" that Mr. J's injuries may have been self-inflicted is simply not of the nature of theories. Like any other general expression of scientific knowledge, a theory is always subject to revision in the light of further evidence: it may revert to the rank of a hypothesis, or it may be shown to be utterly false.

Has none of us ever been guilty of calling his own opinions "facts" and other people's opinions "theories"? As Allbutt has pointed out,⁶ "By calling familiar opinions 'facts', and novel or unfamiliar opinions 'theories', ideas new but true are swept into the same heap with visionary speculations, hazardous suggestions, and arm-chair guesses." We who bear teaching responsibilities are sometimes accused of burdening our students with a useless load of "theoretical facts"; such a term is as meaningless an absurdity as an "abstract iceberg". Again, to say, as is so often said of the doctrine of evolution, that what was formerly merely (!) a theory is now an established fact, is nothing but an impossible terminological contradiction; compared with this, it were easy for the leopard to change his spots, or Jupiter to turn into a bull.

A *prediction* is a statement that something will or will not occur. All prognosis is, of course, prediction. No matter how confident we feel in our prediction, it is never a statement of fact. It is not a fact that a decapitated person will die, but a prediction which is practically sound because, on the strength of records of past experience, we regard it as enjoying a degree of probability amounting to virtual certainty, though strictly speaking even this is an assumption. Still, we order our

entire lives upon such assumptions, for we have nothing better.

PRACTICAL APPLICATIONS

The last sentence leads naturally to the question: How does all this concern the practical physician? The doctor bases his treatment upon (a) the facts of the case, and (b) the relevant ideas generated in his mind by what he recalls of his own experience, and what he knows of the experience of others, with more or less similar cases. These ideas are the distilled quintessence of vastly more facts than the human mind could possibly handle separately; moreover, the facts of experience can be utilized for the benefit of the patient only by means of the ideas flowing from them. For example, the advice to a patient suffering from acute appendicitis that he submit to an immediate operation is based not directly upon the fact that, according to most trustworthy records, the mortality has been much higher in such cases when operation has been deferred or avoided than when it has been promptly and skilfully performed but upon the idea springing from this experience that (assuming the absence of clear contraindication) this particular patient is much more likely to enjoy a satisfactory recovery if he submits to a prompt operation than if he does not. What is applied is not facts about *other* cases but ideas about *this* one. Thus it is that the practical man uses ideas more than facts; practical work consists essentially of ideas in action.

Allbutt has emphasized the practical consequence of ideas in the following passage:¹

When we declare, as continually we do, that reality and strength lie in facts, we deceive ourselves: the strong and the real are to be found in ideas and, to use the word of science, in theory. Until it is built into theory, or idea, a fact is of no more use than a brick—to be wasted on any passing stranger. By ideas it is that men lead, nations prosper, and dominions are established; by ideas dynasties are overthrown, nations convulsed, and peoples scattered; by them the tyranny of custom and the dogmas of schools are broken up; by them we interpret, we work, and we prophesy.

Let me invite you to contemplate for a moment what you know of the record of the single idea of communism as a determiner of action during the past fifteen years. We are all enthralled in bondage to our ideas, and from that slavery there is no escape. Imagine the impression that the action of pouring oil over water in an attempt to control the spread of the ague would produce upon a savage ignorant of the underlying ideas; to offer a sacrifice to his gods would seem to him far more rational, and hence more

likely to "work". Effective control of malaria had to await the development of fairly correct views regarding (a) the organismal cause of the disease, (b) the part played by certain mosquitoes in its transmission, (c) the life-history of those mosquitoes and (d) the respiratory mechanism of their larvæ. To be effective, considered action must be instigated by sufficiently correct ideas. Notwithstanding all this, the practical man has an intuitive feeling that facts are important to him, and this intuition is sound, for if ideas are to "work" in practice they must be adequately founded in fact; hence the good practitioner endeavours to evaluate his ideas, and that implies at least some acquaintance with the facts whence they have been derived. Of course, in the formulation of new ideas familiarity with the relevant facts is essential.

The chief object of these remarks is to emphasize that in the actual care of his patients the doctor uses surmises, hypotheses, theories, generalizations, principles and truths more than facts. To do good work with such materials calls for a superior mind, well trained; that, and no less, is demanded of him who aspires to the dignity and responsibility of practical work in a field like medicine, wherein the application of knowledge must be thought out afresh in each individual case. This is a matter of general scientific education rather than of specialized professional training; upon another aspect of this relationship between medicine and general culture I have touched elsewhere.⁷ As recently pointed out by Dr. Primrose,⁵ the importance of the improvement in the general scientific education of our profession is well exemplified by the contrast between its attitude toward the suggestion of applying antiseptics to wounds and its reception of the idea of administering insulin to diabetics: "It took 25 years to convince the profession of the validity of Lister's discovery; in as many weeks insulin was accepted and utilized by the modern practitioner". Which was of wider practical applicability?

REFERENCES

1. ALLBUTT, T. C., *On Professional Education*, Macmillan, London, 1906.
2. *Ibid.*, Notes on the Composition of Scientific Papers, Macmillan, London, 3rd ed., 1923.
3. GILBERT, W. S., *The Mikado*, Act II.
4. PEPPER, S. C. et al., Studies in the nature of facts, *Univ. Calif. Publ. Philos.*, 1932, vol. 14.
5. PRIMROSE, A., Medical education, *Canad. M. Ass. J.*, 1933, 28: 78.
6. Quoted by ROLLESTON, H. D., *The Life of Sir Thomas Clifford Allbutt*, Macmillan, London, 1929.
7. THOMPSON, I. M., On premedical education, *Calif. & Western Med.*, 1932, 36: 167.

Medical Economics

ORGANIZED MEDICINE AND THE PUBLIC HEALTH*

BY GRANT FLEMING, M.D.,

Montreal

There has always been a great deal of controversy concerning the relationship of organized medicine, as represented by its societies, to the public health services. In order to appreciate the present situation, it is necessary to recall something of the history of public health. It was in England, during the reign of Queen Victoria, that the modern public health movement was born. It had its beginnings as part of the humanitarian effort which was then sweeping the country with a view to alleviating the appalling conditions existing among the masses of the people. Under lay leadership, but guided by medical advice, the public health movement, in its early phases, sought to draw attention to the burden of disease and ill health which was crushing the people. Believing that this condition was due to insanitary living and working conditions, a concerted effort was made to arouse public opinion to demand the correction of these conditions.

When Queen Victoria ascended the throne in 1837, the state had assumed no responsibility for the health of the people. The only practical interest displayed was the provision of a comparatively small sum of money for the purchase of small-pox vaccine. As a result of the work of the early reformers, the year 1875 witnessed the passing of the English Public Health Act, which has been described as our charter of hygienic liberty, and which marked the time when the care of the public health was recognized as being a definite state responsibility. From that time on, the field of public health has been enlarged and extended. At first, it was practically confined to sanitation, but it soon embraced communicable disease control, an extension made possible by the discoveries of Pasteur. The beginning of this century saw organized campaigns against tuberculosis and infant mortality initiated. These activities brought public health into what might be described as clinical services, and opened the field of public health education which has now become a major function of public health. On the whole, it may be said that official public health services have not, on their own initiative, invaded new fields of public health. In general, voluntary health agencies have been the

pioneers. These voluntary efforts have been inspired by lay or professional individuals or groups, who, believing that certain measures would improve the public health, have sought, through education and demonstrations, to bring the public to demand that these new activities be taken over or paid for by the public health authorities. The present program of public health is therefore the result of a gradual growth. It has reached its present stage of development in response to public opinion which has expressed a desire or a willingness to be taxed in order to secure a certain measure of health as well as protection from disease. Public health, as now developed, covers that field of preventive medicine which it has been found to be necessary or expedient to apply on a community basis. Public health services are not spread evenly over the country; in general, rural areas are not as well served as are urban areas. This inequality of service is due to the comparatively greater willingness of some districts to tax themselves for public health services, to the greater ease of providing service in urban areas, and to the fact that, in the larger centres, voluntary health agencies have displayed more activity.

During the period of public health development organized medicine has been, on the whole, quiescent. In some places, active support has been given by the profession to measures for securing safe water and milk supplies. In a few places, health activities have been sponsored. In others, there has been opposition to such measures as the reporting of tuberculosis and the supervision of well babies. It is fair to say that general support has been given by the profession to those public health measures which deal with sanitation, with water, milk and food supplies and the control of communicable diseases, but that, gradually, there has been building up an opposition to those public health measures which might be called clinical, that is, which call for individual attention by a physician. It is in these latter fields that we hear complaints about the invasion of the field of private practice by public health services.

If we accept the contention that this is the field of private practice, why then has it been invaded by Public Health? In all fairness it must be said that the reason in the beginning was that the field was neglected. This is not an argument for the continuation of the present system if it is shown to be faulty, but it does away with grounds for criticism of Public Health's having entered the field. If the people become convinced that a certain condition can be improved, they demand action, and if such

* Read at the Sixty-fourth Annual Meeting of the Canadian Medical Association, Saint John, N.B.

action cannot be promptly and effectively secured through the general medical profession, then the people will require that action be taken by their public health department. This was the history, for example, with regard to infant mortality. Before well-baby clinics were established, the number of babies who received health supervision from the family physician was negligible. The field of work was there, but the medical profession did not accept the opportunity; indeed, they did not apparently even recognize the need until it had been shown by voluntary well-baby clinics, established first in France and then in other countries, that the health supervision of the well baby was a worth-while field of medical practice. It is a matter of fact that in those places which are not now being served by well-baby clinics, the private physicians are not, as a rule, providing such health supervision.

Although mental disorders comprise a large percentage of all illness, the medical profession has shown but little interest in either the prevention or the treatment of such disorders. The result has been that mental hospitals have become state institutions, seldom entered by the family physician, who, unfortunately, has not, as a rule, assumed responsibility for the mental health of his patients. How many patients are dismissed by their family physician when he does not find a physical basis for their complaints?

At the present time, the fields of pre-natal care and health supervision of adults are practically untouched by public health services, and yet the number of expectant mothers and of healthy adults who receive regular health supervision from their family physician is comparatively small.

There is no reason why private physicians should not be active in small-pox vaccination and diphtheria immunization; nevertheless, these activities nearly always wait until the health department of the area gives the lead. It is only in areas where the law requires it that small-pox vaccination is a routine. Apparently the profession in general is indifferent, because most families will accept vaccination if it is offered by the family physician.

The conclusion which might be drawn from these observations, and which, to my mind, is the correct one, is that the organized medical profession has not taken its proper place in public health work, for the reason that the organized medical profession, as such, has not drawn up a definite policy or plan of action. Time which has been given to criticisms and recriminations might better have been devoted to constructive planning.

What then is the proper relationship of organized medicine to public health? In the first place, if it is accepted that the family physician is the pivotal point around which

centres any system of adequate medical service, it is desirable to strengthen his position. This must be true if the family is the logical unit for medical care. Obviously, it is even more in the interests of the public than of the profession that the quality of medical services be maintained. It would be a short-sighted policy which would seek to weaken the standing of the family physician in order to attain some immediate public health service. The serious question which we have to solve is as to how the two are to be harmoniously adjusted.

As has been stated, the public demands action. If the public health authority is to make use of the medical profession and make that body, in practice, a working unit of the health machine, then the medical profession must be so organized as to be able to act as a unit. That this is possible has been demonstrated. In most communities, diphtheria immunization has been organized on a clinic basis. A few centres, notably Detroit, have been successful in having the immunizations made by the family physician, the health department assuming responsibility for the education of the public and paying for those who were unable to pay.

This raises a point which is not usually understood by the medical profession, namely the difference between a public service and charity. A public service is available to all as a right, being paid for out of taxes to which all contribute, presumably according to their ability to pay. Public services include our public school system, police and fire protection, the cleaning of streets, the removal of garbage, etc. The question of the individual's ability to pay when benefiting by one of these services is not raised; he has purchased this service for himself and his family through his taxes. If public health is to be conducted on this basis of public service, then the question of ability to pay must not enter into the availability of such service for all who care to use it. On this basis, we would consider the well-baby clinics, just as we do our public schools, are to be used by all who care to use them, leaving the individual free to use private schools or private physicians if he cares to do so. On the other hand, if public health should be a charity service, in whole or in part, then it can discriminate in offering its services on the economic basis. This decision has to be made, and the organized medical profession should give to it the serious consideration which it deserves, because it is fundamental.

Another point for consideration, which follows logically upon this, is that of payment for service. The state justifies expenditure upon public health, first of all on humanitarian grounds, but by no means less on the belief that it is in the interests of the state that each individual citizen be protected from disease and

be in good health so that he may be a more effective and efficient citizen. It would appear logical that when the medical profession is used in public health, its members should be remunerated by the state. We have witnessed the abuse of the medical profession in curative medicine where the state meets much of its responsibility at the expense of the profession. We do not want this error to be repeated in preventive medicine. For that reason, any plan for using the medical profession in public health should include definite arrangements for the payment of physicians on a service-rendered basis.

With the exceptions which are to be expected, public health workers believe that the medical profession should be much more a part of the public health organization and have a definite place in the organized community work. The difficulty which faces the public health worker in bringing this about is that, in general, the organized medical group with which he has to deal is not really organized, in that it has no plan nor is it prepared to assume responsibility for the discipline of its own members. The Medical Officer of Health cannot use the medical profession in his work unless the members are a unit in their willingness to accept some plan. Furthermore, the Medical Officer of Health must have some assurance of the quality of service, particularly if it is paid for out of public funds, and this assurance should be provided by the organized medical profession. It appears then that the time is more than ripe for the organized medical profession to study public health in order to arrive at a plan whereby it may actively participate in public health services. It would be understood that the profession would present a united front, and be prepared to work as a unit in an organization, and to provide the necessary safeguards for the service by assuming responsibility for the discipline of its own members.

STATE MEDICINE*

By E. A. McDONALD, M.B.,

Toronto

During the past three years, the medical profession has been exceedingly hard hit by the depression, indeed, one may almost say wrecked. Previously, the Canadian people were seen by medical men in the early stages of disease and steps were then taken to ameliorate the conditions and effect cures where possible. This service was paid for to a great extent. Since the depression and lack of employment has become so marked, the Canadian people are

not consulting their doctors until disease has a firm grip upon them, and symptoms are pronounced and their condition critical. Much suffering results, and many valuable lives are too often lost from this absolute neglect.

The medical services rendered are seldom paid for as the people have not the money, and, I am sorry to have to say, in many—too many—cases have not the desire to pay. This loss of desire to pay for medical services is shown in the great increase in the number of public ward and outdoor patients and the marked decrease in pay wards and office calls, so that the medical man is doing what medical work is done, but is not receiving any remuneration for his public ward and outdoor hospital work. Consequently, his income has dropped, until in many cases it is not enough to pay his legitimate expenses and his life's savings are being used to keep him going.

The Government of Ontario has taken note of this condition and passed the Order-in-Council and Amendments as of May 19th, 1933, but put in the word "may" when to make it effective "must" should have been used. In other words, the Government left it to the municipalities to assume the payment of medical costs for medical care of indigents when it should have been made obligatory, for municipalities, like individuals, have not the desire to pay for medical care of indigents, a burden that has always been left to be borne by the medical profession upon whose good heart the municipalities have presumed until they have assumed it is the "duty" not the "privilege" of the profession to relieve them of this burden. Under present conditions, this burden has become so enormous that the doctors are being driven into the indigent class themselves. This cannot be allowed to proceed. The municipalities must be made to assume the payment for the medical services rendered the indigents within their borders, or the Provincial Government should establish State Medicine with payment of a living salary to the profession.

To organize State Medicine, I would suggest that it be made obligatory to all people with an annual income of \$2,000.00 or less; that panels or districts of 800 people be assigned to each general practitioner and he shall look after his panel, giving care and attention both at their homes and his office as needed.

In cases needing hospital care or special examination and treatment, these shall be assigned to specialists.

The specialists shall be assigned the care of the patients of each group of 20 or more contiguous general practitioners.

The general practitioner shall be paid a salary sufficient to enable him to live in comfort and continue his post-graduate studies to enable him to keep abreast of the progress of medicine, say \$6,000.00 per year.

The specialist shall be paid sufficient salary

* Portion of a Presidential Address by Dr. E. A. McDonald before the Academy of Medicine, Toronto.

to enable him to live comfortably and continue his post-graduate studies to allow him to improve his special knowledge and technique, say \$8,000 to \$10,000 yearly.

These moneys to be raised by a general municipal or per capita tax, the same as is now done for payment of police, firemen, teachers, etc.; these moneys to be collected by the municipalities and paid to the Provincial Treasurer and then paid to the profession by the Provincial Government, subject to the following conditions:

1. The free choice of physician by patients.
2. The maintenance of the essential personal relation between patient and physician.
3. This is not meant to preclude the continuation of medical services provided on a fee basis for those who prefer the present method.

The medical staff for the panels to be appointed and governed by a board of medical men representing

1. the Government—as the Minister of Health,
2. a representative of the district of Toronto,
3. a representative of the district of Hamilton,
4. a representative of the district of London,
5. a representative of the district of Ottawa and Kingston,
6. a representative of the district of Fort William, Sault Ste. Marie and Sudbury.
7. a representative of the district of the Ontario Medical Association.

These representatives to be elected by their component associations for a term of years at an adequate salary.

1. This Council to have charge of all appointments.
2. To arrange and assign panels.
3. To draw up rules and regulations, forms, reports, etc.
4. To settle all disputes.
5. In other words, to be in charge of the medical work of the Ontario State Medicine.

To assert that State Medicine can be successfully carried out, we have only to look to England as an example.

At a dinner given in London on July 17, 1933, celebrating the twenty-first year of the National Health Act, at the British Medical Association, presided over by the Minister of Health, Sir E. Hilton-Young, the Right Honourable Lloyd George said:

"Since the panel system was inaugurated, the death rate in this country has fallen sharply, and the infant death rate even more sharply. The doctors themselves are so much better off under the new system that their contentment

rather than their dissatisfaction offers a target of criticism. Another thing not often referred to is the substantial contribution which has been made to medical research. 'The Act' means not only penury and poverty are averted from thousands of British households, but also, that a great health measure on preventive lines is set in motion. The doctors were persuaded—honestly persuaded—that they were faced with ruin. It is a hard-worked profession. There is no profession which works as hard. The doctors have to work at all hours, and have very little leisure—at least, that was true before the Insurance Act; things have improved since then. It was the first time that the medical profession as a body came into politics, and politics is a very heady wine, and you have got to get accustomed to it, and they were not. I do not think they have done too badly for a profession that was going to starve. I see that sickness benefit during all these years has amounted to £178,000,000 and medical benefit to £170,000,000, not all gone to the doctors, but quite a good share of it. In a few days the annual meeting of the British Medical Association is to take place in Dublin. I have no doubt that they will carry many resolutions. It is of no use meeting in a conference without carrying resolutions. Some resolutions I do not doubt will be carried unanimously, but there is one which will not be carried, which will not even be moved, a resolution demanding the repeal of the medical benefit of the National Insurance Act and a return to the old fee system."

SASKATCHEWAN NOTES

The Honourable F. D. Munroe, M.D., Minister of Public Health, introduced an amendment to the Public Health Act, providing for the appointment of a Health Services Board, to consist of five members who will be, the Minister of Public Health, Chairman, the Deputy Minister of Public Health, the chairman of the Local Government Board, the Deputy Minister of Municipal Affairs, and the Commissioner of the Saskatchewan division of the Canadian Red Cross Society. The Board will be in charge of administration of such moneys as may be available from time to time for the purpose of providing health services in relief areas of the province. For three years the administration of medical, hospital and dental relief services has been under direction of the Saskatchewan Relief Commission. The new bill provides for this to be taken over by the Board to be set up. At present medical and hospital relief is being administered in more than 150 rural municipalities, as well as in the case of new settlers who have migrated from the southern part of the province. Authority has been given the Board to conduct sittings at such times and

places as it deems necessary, with a view to collecting information concerning:—

1. The needs of the people with respect to medical, hospital, nursing, dental and other health services, including drugs and appliances.

2. The advisability of providing facilities for periodic medical examinations.

3. The operation of the Union Hospital Act, Hospitals Act, Tuberculosis Sanatoria and Hospitals Act, Cancer Commission Act, Venereal Diseases Act, and the provisions of the Rural Municipalities Act respecting the employment of physicians, with a view to economic administration of health services.

The Board will also be empowered to (1) confer with and advise the council of any municipality with respect to the establishment of health services for the residents of a municipality; (2) confer with and advise employers and employees in cities with respect to the establishment of health services for such employees; (3) consider available health services in outlying and unorganized portions of the province, and make such recommendations to the Lieutenant-Governor-in-Council as it deems fit respecting the establishment of adequate health services; (4) consider methods for equitable distribution of costs of illness; (5) recommend to the Lieutenant-Governor-in-Council the establishment of such temporary health services as it deems necessary in the province or any portion of it during times of economic distress; (6) appoint committees and assign to them such duties as it deems expedient, and delegate to them such powers as may be necessary for performance of the duties assigned.

In addition to the appointment of the Board, provision is made for the appointment of an advisory committee consisting of the president of the Saskatchewan College of Physicians and Surgeons, the president of the Saskatchewan Hospitals' Association, the president of the Provincial Council of Women, the president of the Saskatchewan Union of Urban Municipalities, and the president of the Saskatchewan Association of Rural Municipalities.

LILLIAN A. CHASE

ALBERTA NOTES

The Council of the College of Physicians and Surgeons of Alberta had a meeting recently with the Workmen's Compensation Board regarding the question of adopting a new schedule of fees for medical services to the injured workmen coming under the jurisdiction of the Board. It was decided, however, that the old schedule would continue for the balance of the calendar year, subject to a discount of 10 per cent off all accounts over \$5.00, but in no case would any account thus reduced become less than five dollars. Both the Council and the Compensation Board will consider the question in detail and have another meeting later.

The Legislature at its last session received the report of the Commission of the Legislature on Health Insurance, but did not pass any legislation to put any plan into effect. They did, however, recommend the following:— (1) that the public health program be further expanded, especially in the control of tuberculosis, extension of public health nursing services, the travelling clinics for the outlying points, where such are not available at the present time; (2) that further full-time health areas be established; (3) that at least two demonstration "set-ups", one rural and one urban, be provided for the purpose of demonstrating a contributory health insurance scheme; (4) that municipal districts be urged to avail themselves of the statutory provision whereby municipalities may make grants to physicians; (5) that municipal hospital districts be urged to elaborate the municipal hospital scheme, with the hospital district as a basis for organization.

G. E. LEARMONTH

FACING RUIN

The case for the doctor in these days of long and acute depression was convincingly laid before Premier Taschereau by a delegation of medical men.

Perhaps no profession has been so hard hit as has the medical one by three years of unemployment and distress. It is not that the doctor, like so many engineers, architects and other possessors of learned degrees, finds himself with nothing to do. He is busier than he has ever been, but this very fact is a loss rather than a gain to him so long as he is not compensated for a great part of his services. The fine tradition of his profession plus his own humanity and sympathy render it impossible for him to disregard the calls made upon his skill by a multitude of sufferers who, with all the good will and honesty in the world, have not the money to repay him. It is surely clear that this sort of thing cannot continue indefinitely if a great many of these men are not to be reduced to actual penury. There is no more reason why a doctor should bring himself to the verge of poverty in the service of the public than there is for the landlord or the tradesman to be expected to do the same.

It will be no easy matter to meet the request put forward by the delegation in these days of unending demands for assistance; it will perhaps be impossible to do so in its entirety. But in the long run the authorities will have to decide how much or how little can be done to meet the very critical situation that confronts so many of the medical profession in these cruel times. Of the justice of their claim there can unfortunately be no doubt whatever. We cannot let these men ruin themselves by a service which it is their proud boast they are not merely most unwilling but quite unable to withhold.—*Montreal Daily Star*.

Men and Books

THE HEALING OF A WOUND*

BY SIR ANDREW MACPHAIL

Montreal

The first problem presenting itself to the most primitive man was the healing of a wound. Even animals were not exempt from an interest in the process. They had, and still have, their own methods of dealing with the calamity. Rest was their remedy. They could not read Galen; they were not led astray by wrong theories; and, save for a few isolated exceptions, their passive surgical procedure down to the nineteenth century was in many cases better than our own. If they were denied the use of instruments, they were spared the abuse of them and the use of remedies that did more harm than good. The history of the healing of a wound is the history of surgery. For the modern surgeon, who is under forty years of age, a wound has no existence. The healing is automatic and inevitable, governed by a law of nature, uniform and universal. Accustomed to wounds, which he himself has made amid ideal surroundings, with his own chosen instruments, upon tissues selected and prepared in advance, healing is a natural process of some interest to the patient and the nurse, none to the surgeon. Failure to heal is the miracle.

From this complacency surgeons were suddenly aroused twenty years ago by the harsh voice of war. War is the father of all things. With that desperate saying from Heraclitus, *Πόλεμος πάντων πατήρ*, the German history of their medical service begins. War is the father of surgery, of military surgery and of civil surgery too. There is a military surgery and a civil surgery. The two are quite distinct, although they both arise from the same stem. Apart from motives of humanity, the soldier healed of his wounds was fit to fight a second time. What the surgeon learned in the field he practised when he returned to civil life. War is as old as the race, and wounds go with war; but there was always a surgery of some kind to meet the need. At the siege of Troy two medical officers are named, who were exempt from all other duties. Hippocrates alludes several times to medical service in the army; his son served with Alcibiades in Sicily. In the Crissæan war the medical officer had a technical gallery with complete equipment; the Spartans had a good

service, and in the Persian armies the surgeons were compelled to attend the enemy wounded as well as their own. That is the first sign of the Red Cross. For eight hundred years the development of the Roman service is quite clear from the days when the soldiers bandaged their comrades' wounds, and to escape from action occasionally bound up imaginary wounds upon themselves, which was a much neater device than the modern practice of self-inflicted wounds. Finally, a regular corps was established, which differed little from our own, except that the officers had double pay.

These wounds of old war are described on many pages of ancient history and poetry, which are often the same thing. Here is the most ancient: Penelios struck Iloneus beneath the eyebrow towards the back of the eye, of which the pupil was torn away; and the spear, piercing the eye, came out at the back of the head; and Iloneus, his hands stretched forth, fell. For such a wound there is no healing—then or now. A more modern case is that of Julian, the Apostate, as his enemies yet describe him: A javelin, after grazing the skin of his arm, transpierced the ribs, and fixed in the interior part of the liver. Julian attempted to draw the weapon from his side, but his fingers were cut by the sharpness of the steel, and he fell senseless from his horse. His guards flew to his relief, and the wounded Emperor was gently raised from the ground and conveyed into a tent. After recovering consciousness, he called for his horse and arms, but his strength was exhausted; and the surgeons who examined his wound discovered the signs of approaching death. His wound began to bleed afresh; his respiration was embarrassed; he called for a draught of cold water, and as soon as he had drunk it expired without pain about the hour of midnight. Had this happened under modern conditions the august soldier would have been on the operating table of a Field Ambulance in two hours. Worse wounds have healed; he might have lived; but we should miss the noble funeral oration which he pronounced upon himself, occupying two pages in Edward Gibbon's history.

In the opening days of the recent War the civil surgeon was a menace, until he learned that war is a rough business, and that his practice must be modified to conform with hard conditions new to him. For the treatment of a wound there is no established ritual. The surgeon must do the best he can in the circumstances in which he finds himself. In the long period of peace preceding the War there was a discovery of surgical principles and a development of technique such as the world had never

* Published by arrangement with the *Quarterly Review*, January, 1934, 262: 111-123. John Murray, London.

witnessed, but the surgeons had lost touch with reality. By the continual observance of the behaviour of civil wounds which they themselves had made, they were by the contrast astonished at the vast wounds of war, and for the moment they were bewildered. Antiseptics of all kinds were used freely. These were of value in wounds that would have healed without them, and they destroyed any infection that had not yet occurred. Asepsis in the field was like a lost tradition. The drainage of septic joints, the irrigation of them through rubber tubes, the application of short splints to long limbs meant amputation at the base. Operators who from their training must close every wound by sutures, and yet were prevented by their knowledge and conscience from closing them, employed an emulsion of bismuth, iodoform, and paraffin, and so evolved the delayed primary suture. But by their scientific training they had acquired a flexibility of mind that left them quick to conform with a new experience. In no long time they discovered that the proper surgery of the front was to clean the wound, ruthlessly cut away all dead and dying tissue, check bleeding, and pack the cavity with some light material soaked in a harmless fluid. Speed in evacuation from the field to the base, where the victim had the advantage of a more deliberate surgery, finally solved the problem. After one battle which opened at five o'clock in the morning the ambulance trains were in London at two o'clock the same afternoon. The long Thomas splint held its own to the end, and was carried by the regimental bearers in the assaults. Blood transfusion was practised even in the trenches.

Let us, then, not think that we have learned all and forgotten nothing. We forgot the war lesson of history: If a wound is clean, leave it alone; if it is not clean, clean it, and leave it alone. Neither let us think too hardly of the old surgeons; they were doing the best they knew; they had the mind of their period. The medieval mind was alert for wrong beliefs in theology, which it was surmised might lead to an eternity of pain. That pain in time was discovered to be subjective rather than material; but the pain inflicted by the medieval mind through a wrong conception of the healing of a wound was real and material for eighteen centuries. In both cases the medieval mind reasoned correctly upon premises that were false. The medieval surgeon strove for suppuration; and the beneficence of suppuration arose from the doctrine of the four humours. Pus was considered to be a crudity or coction of those imaginary qualities. Indeed, it still goes by the name of humour; and the French speak of a suppurating scrofula as *l'humeur blanche*. The formation of pus was encouraged to relieve the system of an inherent crudity. Poultices, grease, and salves were applied to fresh wounds; tents saturated with irritants were thrust into

them, to promote suppuration, to get it out of the system, as we still say.

The first primitive observation was that some wounds healed; others did not; the patient died. What part the surgeons played in the tragedy was concealed from them and from the patients alike. The very means they adopted hastened the end. It was observed, further, that all serious wounds were accompanied by suppuration. That was nature's method of extruding a foreign body. By trusting blindly to nature they were led astray. An incomplete experience is the falsest of guides. The business of the surgeon even yet is to assist nature by doing for her what she cannot do for herself, or does very badly. In the vain attempt to assist nature, the old surgeons only thwarted her. With probers, tents, and fingers they "searched" the wounds. They closed them with salves, concoctions, and balsams. "Is banishment the balsam," Shakespeare asks, "that the usuring Senate pours into captains' wounds?" These balsams were the equipment of every surgeon, and they were held to be so potent that they received holy names—St. Paul, St. Thomas, St. Victor. Galen brought the balm of Gilead from Damascus: there were balsams of Tolu, of Peru. Friar's balsam, once known as Crusader's salve, is yet used by us. The wounds were sealed, an abscess formed, poultices were applied, the abscess burst, and if the patient were yet alive he recovered from his injury.

In the long range of history a surgeon is accounted great according as he understood the subject of suppuration. The history of suppuration is the history of surgery. Nature has two methods of healing a wound, by first intention and by suppuration. The great surgeons who tower above the base crowd of bunglers strove for primary healing, but for centuries they were borne down by the false readers of Galen, who followed the method of suppuration as nature's only cure. Roger of Salerno, in 1180, was their leader; he promoted coction by suppuration and dressed wounds with galenical salves. Surgery took the wrong turning, and remained on the wrong course until our own time. Powerful voices were raised in protest. Celsus, in the first century, warns the surgeon, in his anxiety to exclude the air, not to use the suture until the depth of the wound was so cleaned that no clot remained, for this formed pus, excited inflammation, and prevented union. The most powerful was Theodoric, in 1266, *qui pulcherrimas cicatrices sine unguento aliquo inducebat*. It is not necessary, he protested, as all modern surgeons profess, that pus should be generated in wounds; no error could be greater; it hinders nature, prolongs the disease, and prevents the healing of the wound. This was a true precursor of Lister.

Henry of Mondeville was his successor with the dogma: Wash the wound free from all

foreign material; use no probes or tents; apply no oily or irritant substances; avoid the formation of pus, which is not a process of healing. Many more surgeons, he said, know how to cause suppuration than to heal a wound. Avoid everything likely to cause pus, *medicinæ quæ faciunt nasci pus*. Nor did he disdain the effect of the mind upon the body. If a patient was losing courage, he was to be told that he had been nominated for a high office. He and his followers washed the wound with wine; they removed every foreign body; they brought the edges together, and did not allow even the wine to remain within. Nature, they said, supplies the means of union in a viscous exudation, or natural balm as Paré called it, adopting the word from Paracelsus. In old wounds they did their best to obtain union by cleansing, drying, and refreshing the edges. Upon the outer surface they laid lint soaked in wine or alcohol, which soon evaporated and left the wound dry. They avoided salves and powders, which only shut in decomposing material—*saniem incarcerant*. This was a reversion to the method of Rhazes, the Arabian, who was born in 925, authorized by the Hippocratic school which strove for a dry wound with adhering surfaces. It was also the practice of that certain Samaritan of the first century, who found a man half dead, and having poured in oil and wine bound up his wounds.

It will be hard for us to believe that a belief in the beneficence of suppuration prevailed down to our own time; but those fairly modern surgeons, as a compromise or evasion, strove for a pus which they called laudable. Let us cite an impressive piece of evidence. Sir Thomas Clifford Allbutt, regius professor of medicine in the University of Cambridge, in an address at the St. Louis congress in 1904, records his own experience.

"In the third quarter of the nineteenth century, in my days as a physician, the apothecary of a large hospital showed me a row of amputations, with stumps pouring out pus in cataracts upon the cushions, and exclaimed, 'That, sir, is what I like to see; nothing so wholesome in a wound as a good discharge of laudable pus'."

It is hard also for us in these public days to believe that many important procedures were retained as professional secrets and personal perquisites. Humane men from Hippocrates to Sydenham declaimed against the practice. The "major apparatus" for lithotomy was a long mystery; Jenner was derided as a fool for revealing gratuitously his inoculation against smallpox. An English horse-doctor who had unusual success in his familiar operation only revealed his secret with his dying breath: I boil my tools.

The ligature as an instrument in the healing of wounds must have suggested itself to the most primitive surgeons. As they failed to dis-

tinguish between artery, vein, and nerve, they did not know what to tie. One surgeon who tied the musculo-spiral nerve along with the artery was pursued by the victim with a sword whenever he appeared in the public streets. For a studious scholar the history of the ligature would be an interesting theme. It would involve a search of the literature beginning with the first century and ending in the nineteenth, when Lister devised absorbable ligatures made from animal membranes. From Heliodorus, who wrote shortly after Celsus, we learn that the ligature was employed in the operation for aneurysm. We even know where Antyllus procured the Celtic linen thread for the purpose, at a shop in the Via Sacra between the temple and the forum. At various points the ligature appears: in 1180 by Roger, who learned its use from Paul of Egina; in the thirteenth century by Lanfranchi; but it was left for Ambrose Paré, in the sixteenth century, to revive the method; yet it required a hundred years to establish the practice. This great surgeon brought a fresh mind to bear upon a new problem, the healing of gunshot wounds. Up to his time the custom was to pour in boiling oil. On one occasion there was not enough of the remedy, and he discovered that the patients did not suffer from the lack. Henceforth he had the temerity to remove foreign bodies, to cleanse the wound with water and alcohol; he contented himself with a simple bandage and much other rational surgery.

The best surgeons had a prevision of antiseptics. They feared the air; and that fear led to the sealing of wounds with salves and the abuse of the suture. They knew only too well the malignant atmosphere of the hospital. Cleanliness was to them an instinct; it was enjoined upon the Hippocratic surgeons to wash the hands, to cut the nails, to boil or filter the water, to use only new dressings. It was left to Semmelweis to discover, in 1847, that obstetricians killed patients they attempted to relieve. When he compelled his assistants to wash their hands in chloride of lime, puerperal fever was brought under control. These old surgeons felt their way. They left nothing untried. What Lister it was who devised the method of searing an amputated stump with a red hot iron we do not know. It was a great discovery, and saved innumerable lives; it is yet a good method in similar circumstances. It was improved upon by Colonel Swenny in a troop-ship coming from India. In his own words to the present writer,

"A man fell from the main-top and smashed his arm; it was hanging by the sinews. I asked a sailor for his clasp-knife. He gave it to me open. The knife was clean; it had just been used for cutting tobacco. I cut off the arm with one slash; the bone was already broken through. I was holding the butt of the arm in my fist, to keep the man from bleeding to death. The sailor was caulking the seams of the deck with oakum and hot tar. I called for the bucket, and thrust the stump into the hot tar, pulled

it out, and let it cool in the air. Not a drop of blood was lost, and in ten days the scab came off, leaving the wound as clean as a salmon fresh from the sea."

The long history of the healing of a wound falls into two periods. The dividing line fell in our own day, with Lister's practice of aseptic surgery. Two other divisions may be made, at the point when Ambroise Paré substituted the ligature for the red hot knife and cautery, and when Morton discovered the use of anæsthetics. This new surgery is the experience of a single lifetime. A recent writer in reminiscent mood reminds us how new a thing modern surgery is.

"In the largest London hospital," he says, "when I was a dresser, as that humble functionary, now known as an interne, was then called, I was about to assist at an operation for the amputation of a leg. In those days there was a style. Instead of the prevailing white uniform, we wore a frock-coat and a beaver hat. The Professor of medicine from whom I first had lectures always appeared in evening dress with white necktie, although the hour was eleven o'clock in the morning. This London surgeon removed his frock-coat, washed his hands, and dried them carefully with a towel hanging on the wall. He then took from a peg and put on an old frock-coat, caked with the blood of innumerable operations. He recommended me to do likewise; but as I had no other coat, I was compelled to risk having my new coat soiled. In those days the fear was lest the surgeon might receive harm from the patient: now the process is reversed, the danger is that the patient may receive harm from the surgeon. I have seen a more delicate surgeon wash his hands, and merely turn back the sleeves of his coat in preparation for cutting a man for the stone. The buttons on the cuffs of the modern coat are a reminder of that old convenience. I need scarcely add that both patients died, and this practice was in vogue twenty years after Lister had enunciated the principles of aseptic surgery."

But Lister's work was not a casual and isolated discovery. It was the slow result of long experiment based upon history and scientific principles. What, before Lister, did pathology teach? Mr. Treves inquires: That all organs and tissues had different ways of healing according to their anatomy; that the healing of the skin and muscles was easy; that the process in bone was slow and dangerous; that the serous membranes were in a class by themselves, most sensitive to injury and difficult to repair. Lister now asserted that the healing of all tissues was uniform and constant if germs were excluded. Surgery, then, had the same certainty in all tissues. It was governed by a scientific formula. His method was elaborated in the minutest detail; it was based upon a conception that was entirely new. Beginning from a fundamental and verified observation, he determined the general laws of repair. Lister came into a surgical world which had not advanced much beyond the experience of Paré. Ligatures and open exposure was the rule. The traditional surgeon made the round of his beds, and gave a tug at these dangling strings which the nurse had carefully exposed for his convenience. If he pulled too hard the ligature cut through, and the pa-

tient might die of secondary hæmorrhage. The skill of the surgeon lay in his ability to estimate the precise amount of force required as he pulled.

On the other hand, even amongst those who realized the importance of drainage, there was fear and distrust of these ligatures. Sir James Y. Simpson was chief of these, and he discarded the use of these putrid setons for the method of torsion of small vessels and acupressure on large ones. By the use of long metallic needles he avoided primary hæmorrhage. The practice was to thrust the needle into the tissue, pass it over the vessel, and into the tissue beyond. This method, although it originated in Edinburgh, was most practised in Aberdeen by William Pirrie, who reported remarkable results; and for the first time in modern surgery amputations were done without the sequel of suppuration. At this time the surgery of Scotland was the best in the world; and still further attention was excited by strange reports coming out of Glasgow. The story from Glasgow was that a certain Mr. Lister was having unusual success with "a local dressing" of carbolic acid. This substance, men said, was not new; it was merely another of those sanative compounds known for all time. Lister replied that he was not using it as a local dressing, but in a new way for its germicidal qualities. That was his discovery, his new way of healing a wound.

In science everything has a cause. The cause of Lister's discovery was the research of Pasteur. In the first communication which he made to the profession about his new method of healing a wound, in the *Lancet* of March 16, 1867, he writes:

"We find that a flood of light has been thrown upon this important subject by the philosophic writings of Mr. Pasteur, who has demonstrated by thoroughly convincing evidence that it is not to its oxygen or to any of its gaseous constituents that the air owes its property of infecting wounds, but to minute particles suspended in it, which are the germs of various low forms of life, long since revealed by the microscope, and regarded as merely accidental concomitants of putrescence, but now shown by Pasteur to be its essential cause, resolving the complex organic compounds into substances of simpler chemical constitution, just as the yeast plant converts sugar into alcohol and carbonic acid."

Men could write in those days.

It had long been known that retained secretions in a wound were a menace. As early as 1825 Mr. Syme, in a paper in the *Edinburgh Medical Journal*, remarked that wounds of the cheek having two orifices healed readily, and he urged delay in closing all wounds until the oozing had ceased. About this time the method of Amussat for avoiding hæmorrhage by torsion of the vessels came into vogue. Mr. Syme adopted his plan for the smaller branches, but he was unwilling to abandon the use of ligatures, as he considered them useful for drainage.

These ligatures were of silk well waxed, and the ends were allowed to hang out of the wound; it required three weeks for these ligatures to cut their way out, and the wound must be kept open and exposed to infection for that time.

Lister's discovery, like Sydenham's, met first with neglect and then with opposition. Even in Scotland it was received with contemptuous criticism. Simpson dismissed the germs as mythical fungi, having no more existence than the aerial sylphs and spirits of the Rosicrucians. The whole question of spontaneous generation was involved; it was only disproved by Tyndall after the labour of a lifetime. Aberdeen was slow to give up its metallic needles. The rivalry was intense. Even students did what they could in their own well-meaning way to solve the problem, by breaking windows. Many surgeons gave the method a conscientious trial, and failed; it was the fault of their practice. One of them has been seen holding a needle in his teeth whilst he wiped out a wound with a dirty sponge; and he called himself a follower of Lister. Simple as the method was, splendid in its simplicity and magnificent in its littleness, as Mr. Treves describes it with his fine felicity of phrase, it soon became debased. It was known that germs were in the air. Therefore the air that entered the operating room must be filtered through a layer of cotton wool. The air was purified by a carbolic spray until the floor was awash like the deck of a schooner in a heavy sea. Clean wounds were doused with carbolic acid, the surgeons forgetting the master's teaching, that "an antiseptic is injurious to the cellular elements of the body as well as to the microbes; the art of the surgeon lies therefore in employing it in sufficient but not in excessive amount."

At this point students interpose with the question, Why is it that surgeons do not now use carbolic acid? They are confused by the unfortunate distinction implied by the terms aseptic and antiseptic. It was Lister who made the discovery that if no germs are present, a wound will heal. Obviously, if no germs are present, one does not require an antiseptic to destroy them. The surgeon's business is to refrain from introducing them; then he is operating aseptically. The word "aseptic" is as old as Hippocrates. He taught that wounds should be dressed dry; Chassaignac taught that they should be drained. What they talked about Lister did, and explained the reason. The most recent exponent of this stupidity declares that "a completely impermeable dressing was one of Lister's ideas." The exact contrary was the case; he substituted for his original putty a lac plaster, because it would not adhere to the skin; he employed a drain of lint in all important wounds; he was the great exponent of the open method, so long as there was the least possibility of any infective substance remaining within.

The news of the discovery went slowly over

Europe. Volkmann came from Germany, Bloch from Denmark, Lucas-Championnière from France. It reached Billroth through Volkmann; but it was not until 1879, more than twelve years after the discovery, that this great surgeon was sufficiently interested to make specific inquiry. In that year he sent Von Mikulicz-Radecki to London, where Lister then was, to verify the earlier reports which his other assistants, Gussenbauer and Wölfler, had brought. There he learned from Lister "precision and consistency," without which, as he said, "a surgeon is a mere bungler in the treatment of wounds." The method was brought to America by four Canadian house-surgeons of Lister's, one of whom, John Stewart, retired only in 1932 from the office of dean in the medical school at Halifax. Pasteur and Lister came together in person for the first time in 1892, in Paris, on the occasion of Pasteur's jubilee, when it appeared to his biographer, Lucas-Championnière, "as they arose to embrace one another, the sight of these two men gave the impression of a brotherhood of science labouring to diminish the sorrows of humanity." To most men Lister is now a vague and shadowy figure, but not to those who saw his beautiful face when he came to Montreal in 1897.

So much has been said—more than some will care to hear—about Edinburgh, Glasgow, and Aberdeen that they may expect to be told that Lister was a Scotsman. One would be guilty of suppressing the truth did one not confess that he was not. He, an alien, went to Edinburgh in 1854, where he remained for six years; he went to Glasgow in 1860, and did not return to London until 1877. He, an alien, gained entrance into the stronghold of Scottish surgery, where he managed to remain for twenty-three years. That in itself was something of a feat, for we may have been led to suspect that Scotsmen only yield to superior force and are not easily robbed of professional or other privilege. One should add that he married Syme's daughter; that may be a partial solution of the mystery. The whole truth is that Lord Lister, as it is correct to name him, was born in Essex. He was of the Society of Friends, commonly known as Quakers. On that account the two major Universities were barred to him; he graduated from University College, London, bachelor of arts in 1847, bachelor of medicine five years later; and in the same year he was admitted fellow of the Royal College of Surgeons, he then being in the twenty-fifth year of his age. He performed the usual duties of dresser or house-surgeon to Mr. Erichsen, whose text-book is still remembered with respect. Upon the advice of Sharpey he went to Edinburgh "to take six weeks of Syme's clinic." In the process he acquired Syme's daughter as well.

Discoveries of any kind are of no value apart from their effect upon the human mind. Of

all these influences modern surgery is the most powerful. It has robbed war of its worst horrors and poverty of its greatest dread. It touches every human being now alive, because it removes from life something of its uncertainty and danger. A trivial accident to the eyes no longer means that one is to sit in darkness until the end comes. Fear and despair have given way to security and hope. The continuous torture of disease amenable to surgery has passed into the comparative luxury of half-assuaged pain. With pain held in check, death has lost its sting, even if one enters less cheerfully into the waters of oblivion. This anticipation of a seemly death is certain to produce a profound effect upon the human mind.

He is a poor master, said Leonardo da Vinci, whose work surpasses his judgment: he alone is advancing towards the perfection of art whose judgment surpasses his work. Perfection has perils peculiar to itself. The present peril of surgery lies in the perfection of its technique, in the divorce of practice from judgment, in the wider divorce between surgery and medicine. Science and practice, medicine and surgery, can thrive only in a single mind. Divorced, both are condemned to sterility. Under such a divided system a new kind of physician and a new kind of surgeon may be developed—the physician who studies only a part of the patient, governed by the laboratory worker, to whom the patient is nothing more than a series of microscopic slides or chemical solutions. This new surgeon, on the other hand, will know the patient merely as an arrangement of typewritten cards. He will see him for the first time unconscious on the table, when he comes like a masked executioner to complete the sentence of the judge. Physician and surgeon then become sheer empirics, working on a narrow, experimental basis, without philosophical conceptions or even a scientific hypothesis of disease. The wound may heal, although the disease remains, and the patient be denied the privilege of a life not untimely prolonged.

THE TREATMENT OF GANGLION.—H. Günther describes a simple and successful form of treatment for a ganglion. Under the strictest aseptic precautions a small wheal is raised over the ganglion with an anæsthetic. The ganglion is then punctured with a large-bore cannula, and the jelly-like material is removed. The syringe is then withdrawn and filled with collodion, and the ganglion is injected with the collodion. A tight bandage is applied to prevent sepsis, and also to prevent too great movement of the limb. In about twenty-four hours there are signs of slight inflammation, with some redness and swelling of the skin. In three days the ganglion has disappeared. In the author's hands the treatment has always been successful, and he has had no cases of recurrence.—*Zentralbl. f. Clin.*, 1932, June 11, p. 1476.

Association Notes

THE FIRST WESTERN MEETING OF THE CANADIAN MEDICAL ASSOCIATION

BY HEBER C. JAMIESON, M.B.,

Edmonton

The meeting of the Canadian Medical Association in Calgary will mark the third visit of this body to Alberta. Forty-five years ago the 22nd annual meeting was held in Banff; Edmonton had the honour of entertaining the Association in 1912 under the presidency of Dr. Harry Goodsir Mackid, of Calgary.

The Association was a small organization in the "eighties" and its membership was largely confined to Ontario and Montreal, if one can judge from an editorial in the October number of the *Canada Lancet* of 1888, following the annual meeting in Ottawa. There were only one member from the far west, Dr. Milne, of Victoria, a few from the Province of Quebec, and the representation from the Maritimes was disappointing.

The invitation to meet in Banff, B.C. (?), was backed by a communication from the Canadian Pacific Railway offering first-class tickets with meals to and from Banff and four days' stay at the Banff Springs Hotel for \$95.00. Much discussion ensued and a motion to have a permanent place of meeting had to be defeated before a decision to go west was finally reached.

At this time only 33 physicians were registered in the North-west Territories. It is true that a few others in practice had not as yet conformed. Some of these were attached to the North-west Mounted Police. There remained a small number who had not, for some reason, applied for a licence. Edmonton, Calgary, Lethbridge, Medicine Hat, MacLeod, Pincher Creek and Banff, each had one or at most three practitioners. Of these pioneers few remain. Dr. A. E. Porter lives in retirement in Edmonton. Dr. Andrew Henderson, of Powell River, B.C., has promised to be present at Calgary, and will probably be the sole representative of the Banff meeting. Of the early Saskatchewan men, Dr. Thomas A. Patrick, of Yorkton, still carries on his work and will read a paper on his early experiences. Dr. David Low lives in Regina.

Before the various contingents left the east it was announced that fifteen papers would be pre-

sented. Dr. G. A. Kennedy, of Fort Macleod, and Dr. August Jukes, of Regina, each were to contribute papers to this program.

One hundred and fifty certificates were issued shortly before the excursion started. Among this number were some to American visitors. Dr. William Osler arrived in Toronto with the intention of making the trip, but suddenly changed his mind and went to the Maritime Provinces. Three years before he had visited the far west, and at a later date recalled his journey, writing about the two great types of practitioners — the routinist and the rationalist.

"One evening in the far North-west, beneath the shadows of the Rocky Mountains, we camped beside a

what weary from the long train journey, were driven to the Canadian Pacific Railway hotel.

At eleven o'clock the next morning, the President, Dr. H. P. Wright, of Ottawa, was introduced by Dr. Geo. Ross, of Montreal. As Past-president, Dr. Hingston, of Montreal, was invited to take a chair on the platform and the meeting got under way. Fifteen papers had been promised, but Dr. Augustus Dukes, of Regina, withdrew his on "Endemic fever of the North-west Territories."

Dr. R. G. Brett, who had recently been Professor of Therapeutics in the Manitoba Medical School and had been since 1886 in charge of a sanatorium in Banff, read an address of welcome



small lake, from which diverging in all directions were deep furrows, each one as straight as an arrow, as far as the eye could reach. They were the deep ruts or tracks which countless generations of buffalo had worn in the prairie as they followed each other to and from the water. In our minds, countless, oft-repeated experiences wear similar ruts in which we find it easiest to travel, and out of which many of us never dream of straying."

Winnipeg was reached on August 9th, and a day was spent in sight-seeing. This was followed by a banquet tendered by the local medical men. Several of the visitors spoke and the *Free Press* reported that after an enjoyable stay the party proceeded to Banff, "one of the most beautiful spots on the Coast."

On Sunday evening, August 11th, the special train pulled into Banff and the members, some-

from the citizens of the town. The election of twenty-three members then took place.

What were the outstanding scientific and business problems of forty-five years ago, and who presented them? A perusal of the proceedings then is perhaps of timely interest. Dr. A. H. Wright, of Toronto, read a paper on "Hæmatoma of the vagina and vulva." Dr. G. A. Kennedy next had the privilege of giving the first paper by an Alberta practitioner on the "Climate of southern Alberta." This brought about much humorous discussion, led by Dr. Andrew Henderson, of St. Paul, who had been the first civilian practitioner of Calgary. Dr. H. L. McInnis, of Edmonton, having joined the party in Calgary, after riding two hundred miles, was able to add his meed of praise to that

of the others having so recently experienced the joys of the sunshine and bracing atmosphere of the west. Many physicians in the east today will remember when they sent their pulmonary tuberculous patients to the ranch lands of the western foothills as the result of Dr. Kennedy's paper.

Dr. V. P. Gibney, of New York, gave a paper on "The treatment of hip-joint disease." This was followed by one on "Preventive deafness" by Dr. Buller, of Montreal. "Sulphonal" was the title of a paper by Dr. James Stewart, of Montreal. Dr. Whittaker, of Cincinnati, dealt with "Varicella." The program continued with "The relief of pain in eye and ear affections" by Dr. Reeve, of Toronto. After this came Dr. F. Shepherd, of Montreal, with "Nephrolithotomy"; Dr. Bulkley, of New York, discussed "The early recognition and treatment of epithelioma." An evening session was opened by a paper on "Hernia" by Mr. I. H. Cameron, of Toronto. Dr. Praeger, of Nanaimo, presented "Notes of some surgical cases." The last paper was by Dr. Dupuis, of Kingston, who showed "Some improvements in medical and surgical instruments."

The business session gave most of its attention to moving votes of thanks to the railway, the citizens of Banff, the Winnipeg medical men, and to Hon. Dr. Schultz, Lieutenant-Governor of Manitoba, who had entertained the members at a garden party. Of more general interest was a motion asking the Dominion Government to investigate the climatic conditions of Banff and other parts of the North-west Territories. The local provincial secretaries were to be asked to ascertain the feeling of their respective societies on the question of their affiliation with the Canadian Medical Association. It was urged on all practitioners to comply with the regulations in regard to the reporting of contagious disease, in order that epidemics might be prevented.

The treasurer reported that 84 members had paid the annual fee of \$2.00. The expenses for the year were \$121.07.

At the conclusion of the meeting, many members took advantage of their proximity to the coast to explore its wonders.

The correspondent of the *Canada Lancet* reported that an enjoyable time was spent at the conference, as well on the long train journey, which allowed of unlimited discussions and the making of new and the cementing of old friendships. The magnificent scenery of the mountains was so novel and awe-inspiring that it threatened to interfere with the scientific deliberations of the Association. A mixture of spring water with a pinch of *spiritus frumenti* was a favourite beverage, and enhanced the pleasure of the visit.

The Banff meeting of the Canadian Medical Association was of special interest to westerners, since it saw the birth of the North-west Ter-

ritories Medical Association, which disbanded in 1906, following the formation of the Provinces of Saskatchewan and Alberta. Shortly after this an effort was made to unite the whole west from the Great Lakes to Victoria in one Association, but British Columbia refused to join, and nothing came of the scheme.

Each prairie province since its formation has had independent growth, both politically and medically. In Alberta, institutions for the care of the sick have multiplied with the years. Tuberculous sanatoria, mental and general hospitals have been established and developed along modern lines. Indeed, this expansion has progressed so rapidly that from less than a score of beds in the "eighties" there are now 3,373, which is several hundred in excess of the present needs of the population. The 567 physicians who minister to the physical ailments of the 740,000 people represent numerous nationalities. A department in charge of a Minister of Health directs an ever-widening field of preventive medical activities. The University of Alberta has taught primary subjects for twenty years and graduated students in medicine for nine.

The broad plains of southern Alberta, which swell into the foothills and then rise to majestic snow-capped peaks beyond, captivated the eye and stirred the imagination of the early members. Later, these attractions and those of the north, with its great rivers and expansive lakes have lured many another to Alberta. Perhaps the climatic excellencies described by Dr. Kennedy contributed to this influx.

One wonders sometimes too if the elemental beauties of the west, which inspired the song of the Irish poetess, Moira O'Neill, who lived among these foothills in the early days, were not an incentive to tarry in this province:

Oh would ye hear, and would ye hear
Of the windy, wide North West?
Faith! 'tis a land as green as the sea,
That rolls as far and rolls as free,
With drifts of flowers, so many there be,
Where the cattle roam and rest.

Oh could ye see, and could ye see
The great gold skies so clear,
The rivers that race through the pine-shade dark,
The mountainous snows that take no mark,
Sun-lit and high on the Rockies stark,
So far, they seem as near.

Then could ye feel, and could ye feel
How fresh is a Western night!
When the long land-breezes rise and pass
And sigh in the rustling prairie-grass
When the dark-blue skies are clear as glass,
And the same old stars are bright.

But could ye know, and forever know
The word of the young North-West!
A word she breathes to the true and bold,
A word misknown to false and cold,
A word that never was spoken or sold,
But the one that knows is blest.

**PROGRAM FOR THE SIXTY-FIFTH ANNUAL MEETING OF THE
CANADIAN MEDICAL ASSOCIATION, TO BE HELD IN
CALGARY, ALBERTA, JUNE 18th, 19th, 20th, 21st,
and 22nd, 1934.**

Convention Headquarters — The Palliser Hotel.

Monday, June 18th

- 9.00 a.m.—Registration.
10.00 a.m.—Meeting of Council.
1.00 p.m.—Luncheon—guests of the President-Elect.
Valedictory Address—Dr. G. A. B. Addy, Saint John.
Installation of the new President.
2.30 p.m.—Meeting of Council.
6.00 p.m.—Meeting of Nominating Committee.
7.30 p.m.—Dinner to members of Council, guests of the Calgary Medical Society.
Address—Mr. L. W. Brockington, City Solicitor, Calgary.

Tuesday, June 19th

- 8.30 a.m.—Registration.
9.15 a.m.—Meeting of Council.
1.00 p.m.—Luncheon—
Address—Ven. Archdeacon Swanson.
2.15 p.m.—Official Opening of Exhibit Hall.
2.30 p.m.—Meeting of Council.
7.30 p.m.—Dinner to Council, guests of Alberta Medical Association.
Address—Dr. R. C. Wallace, President, University of Alberta.
7.30 p.m.—Public Meeting in First Baptist Church, under the auspices of the Canadian Public Health Association. Organ Recital, followed by Addresses by—
Dr. T. C. Routley, General Secretary, Canadian Medical Association—Introductory Remarks.
Dr. J. G. FitzGerald, Dean of the Faculty of Medicine, University of Toronto—"Why every community should have a whole-time public health service".
Dr. A. Grant Fleming, Department of Public Health and Preventive Medicine, McGill University—"What such a service should provide for you".

Wednesday, June 20th

- 8.30 a.m.—Registration.

SECTION OF MEDICINE

- 9.15 a.m.—"Some simple observations and procedures of assistance in the diagnosis of tuberculosis by the general practitioner"—Dr. R. G. Ferguson, Fort San, Sask.
"The reactions attending the intravenous use of the arsphenamines"—Dr. Harold Orr, Edmonton.
"Recent advances in obstetrics and gynaecology"—Dr. W. P. Tew, London.
"An estimate of the usefulness of some of the newer anaesthetics in practice"—Dr. Wesley Bourne, Montreal.
"Purpuric conditions in childhood, and their treatment"—Dr. Howard Spohn, Vancouver.

SECTION OF SURGERY

- 9.15 a.m.—"The value of glucose in medical and surgical conditions and its mode of introduction"—Dr. D. S. Macnab, Calgary; Dr. E. P. Scarlett, Calgary.
"Unusual bleeding in middle and later life"—Dr. F. W. Marlow, Toronto.
"Some factors in renal infection"—Dr. D. W. MacKenzie, Montreal.
"Acute septic osteomyelitis"—Dr. F. P. Patterson, Vancouver.
"Surgery of the biliary tract"—Dr. P. H. T. Thorlakson, Winnipeg.
"Fractures of the shaft of the humerus"—Dr. A. P. MacKinnon, Winnipeg.
12.30 p.m.—Luncheon—
Address of Welcome—The Mayor of Calgary.
Address by Dr. Geo. S. Young, Toronto—"The functions and responsibilities of the Council of the Canadian Medical Association."

Wednesday, June 20th.—Continued**GENERAL SESSION**

2.00 p.m.—President's Address—Dr. J. S. McEachern, Calgary.

"Commonwealth versus self-sufficiency"—Dr. E. S. Moorhead, Winnipeg.

"Resistance to experimental tumour"—Dr. F. G. Banting, Toronto.
 "Amœbic dysentery in Montreal District in 1933-34"—Dr. J. C. Meakins, Montreal.

"Cancer of the breast"—Dr. Max Cutler, Chicago.

7.30 p.m.—Association Dinner and Dance.

Address of Welcome—His Honour, the Lieutenant-Governor of Alberta, The Honourable William Leigh Walsh.

Address—The Right Honourable R. B. Bennett, Prime Minister of Canada.

Thursday, June 21st

8.30 a.m.—Registration.

9.30 a.m.—Meeting of the Executive Committee.

SECTION OF MEDICINE

9.15 a.m.—"Types of malignant disease treated by radium at the Cancer Relief and Research Institute in Manitoba"—Dr. Daniel Nicholson, Winnipeg.

"Differential diagnosis of coma"—Dr. Geo. S. Young, Toronto.

"The inflammatory pelvis"—Dr. John R. Fraser, Montreal.

"Prophylaxis and treatment of whooping cough"—Dr. J. M. Frawley, Fresno, Cal.

"Some observations on the liver treatment of subacute combined degeneration"—Dr. H. H. Hyland, Toronto.

"Bone marrow efficiency"—Dr. J. D. Adamson, Winnipeg.

SECTION OF SURGERY

9.15 a.m.—"The surgical repair of facial injuries and harelip and cleft palate congenital deformities"—Dr. Fulton Risdon, Toronto.

"Hæmaturia"—Dr. Emerson C. Smith, Edmonton.

"Damage to the birth canal and its repair"—Dr. A. D. Campbell, Montreal.

Thursday, June 21st.—Continued

"Treatment of fracture-dislocation of the spine"—Dr. K. G. McKenzie, Toronto.

"The surgical treatment of infantile paralysis"—Dr. W. E. Gallie, Toronto.

"The association of cystic bone disease with increased parathyroid function"—Dr. Gordon Fahrni, Winnipeg.

12.30 p.m.—Luncheon.

Annual Meeting, Canadian Medical Protective Association.

GENERAL SESSION

2.00 p.m.—Symposium on Cancer—

Introduction—Dr. A. Primrose, Toronto;

Surgery—Dr. D. C. Balfour, Rochester;

Radiology—Dr. E. E. Shepley, Saskatoon;

Pathology—Dr. W. J. Deadman, Hamilton.

9.00 p.m.—Blackader Lecture—"Some aspects of virus infections, with special reference to virus diseases of childhood"—Dr. Jas. Craigie, Connaught Laboratories, University of Toronto.

Friday, June 22nd

8.30 a.m.—Registration.

SECTION OF MEDICINE

9.15 a.m.—"The relative merit of nitrous oxide and ethylene"—Dr. Wm. Webster, Winnipeg.

"Analysis of twenty-three cases of aerodynia, with special consideration of their incipency and etiology"—Dr. Urban J. Gareau, Regina.

"Sexual sterilization: four years' experience under the Act of Alberta"—Dr. C. A. Baragar, Edmonton; Dr. G. A. Davidson, Ponoka; Dr. W. J. McAllister, Oliver; Dr. D. L. McCullough, Red Deer.

"Recent advances in the physiology of the pituitary gland"—Dr. J. B. Collip, Montreal.

SECTION OF SURGERY

9.15 a.m.—"Clinical experience in the treatment of staphylococcal septicæmia treated by anti-staphylococcus serum, and active immunization by formolized toxin"—Dr. F. A. C. Scrimger, Montreal.

Friday, June 22nd—Continued

"Chronic arthritis"—Dr. J. A. Nutter, Montreal.

"Necrosis and acute oedema of the pancreas"—Dr. Gordon Kenning, Victoria.

"Traumatic rupture of the spleen (emphasizing delayed rupture)"—Dr. C. W. Burns, Winnipeg.

"Cranio-cerebral injuries"—Dr. Oliver Waugh, Winnipeg.

"Periodic health examinations, and the general practitioner"—Dr. H. M. Harrison, Toronto.

12.30 p.m.—Luncheon.

Annual Meeting Alberta Medical Association.

GENERAL SESSION

2.00 p.m.—Symposium on Cardio-Vascular Disease—

"The clinical diagnosis of arteriosclerosis and hypertension"—Dr. Duncan Graham, Toronto.

"The clinical manifestations of coronary disease"—Dr. John Oille, Toronto.

"The remote prognosis in cardiovascular disease"—Dr. C. C. Birchard, Montreal.

"The treatment of cardiovascular disease"—Dr. John Hepburn, Toronto.

SECTION OF EYE, EAR, NOSE AND THROAT

Chairman—Dr. R. B. Boucher, Vancouver;

Secretary—Dr. J. N. Gunn, Calgary.

Wednesday, June 20th

9.15 a.m.—"Diagnosis and treatment of tuberculosis of the eye"—Dr. E. McCusker, Regina.

"Recent discoveries in the pathology of the nasal and aural mucosa"—Dr. Ralph Fenton, Portland, Oregon.

"The treatment of glaucoma"—Dr. S. R. Gifford, Chicago.

"Squint"—Dr. C. M. Clare, Winnipeg.

Thursday, June 21st

9.15 a.m.—"The surgical repair of facial palsy by an autoplasmic nerve graft"—Dr. Jos. A. Sullivan, Toronto.

"Corneal infections"—Dr. S. R. Gifford, Chicago.

"The curability of malignant tumours of the upper jaw and antrum"—Dr. Gordon New, Rochester.

"Contusions of the eyeball"—Dr. W. Harold Brown, Edmonton.

SECTION OF MILITARY MEDICINE**Friday, June 22nd**

12.30 p.m.—Luncheon for all overseas Officers, and Officers of the non-permanent active militia—guests of Dr. J. N. Gunn, D.S.O.

Addresses—

"A special reserve of officers for the Canadian Army Medical Corps"—Colonel F. C. Bell, C.M.G., M.D., C.M., Vancouver.

"Clearing the field in the future"—Major F. C. Clarke, M.C., M.D., C.M., Calgary.

SECTION OF RADIOLOGY

Chairman—Dr. W. H. McGuffin, Calgary;

Secretary—Dr. Bernard R. Mooney, Edmonton.

Wednesday, June 20th

20 minutes for each paper.

10 minutes for discussion.

9.00 a.m.—"Para-nasal sinuses—ethmoids"—Dr. Digby Wheeler, Winnipeg.

"Radiation standards and their practical application"—Dr. P. A. Macdonald, Winnipeg.

"Treatment of Hodgkin's disease from a radiological viewpoint"—Dr. Richard Proctor, Edmonton.

"Epiphysitis"—Dr. H. H. Murphy, Victoria.

Thursday, June 21st

9.00 a.m.—"A radiological study of the development of the spine and pathological changes in the intervertebral discs"—Dr. G. H. Malcolmson, Edmonton.

9.30 a.m.—Symposium on the relationship of the radiologist to some phases of medical practice:

(10 minutes each: 20 minutes for discussion)

Thursday, June 21st.—Continued

"Relationship of the radiologist to the hospital"—Dr. B. J. Harrison, Vancouver.

"Standing of the radiologist in the treatment of disease with radium"—Dr. E. E. Shepley, Saskatoon.

"Relationship of the radiologist to public organizations, *i.e.*, Health Insurance Boards, Workmen's Compensation Boards, etc."—Dr. C. W. Prowd, Vancouver.

"Relationship of the radiologist to the profession"—Dr. C. M. Henry, Regina.

11.00 a.m.—Election of Sectional Officers and Business Meeting.

Friday, June 22nd

9.00 to 12.00 a.m.—"Cancer Clinic"—Dr. Max Cutler, Michael Reese Hospital, Chicago.

SECTION OF HISTORICAL MEDICINE

Chairman—Dr. D. A. Stewart, Ninette;

Secretary—Dr. Heber C. Jamieson, Edmonton.

Thursday, June 21st

9.15 a.m.—"The pioneer Doctor of Edmonton"—Dr. Heber C. Jamieson, Edmonton.

"Reminiscences of a pioneer Saskatchewan Doctor, 1889-1919"—Dr. T. A. Patrick, Yorkton.

"Satire on medicine"—Dr. E. P. Scarlett, Calgary.

"Notes on the history of psychiatry"—Dr. C. A. Baragar, Edmonton.

"Music and Medicine"—Dr. Fulton Gillespie, Edmonton.

"The first medical journal"—Dr. A. G. Nicholls, Montreal.

"The early doctors of Manitoba"—Dr. Ross Mitchell, Winnipeg.

SECTION OF PUBLIC HEALTH

Chairman—Dr. M. R. Bow, Edmonton;

Secretary—Dr. W. H. Hill, Calgary.

Thursday, June 21st

9.15 a.m.—"Saskatchewan program on province-wide control of tuberculosis"—Dr. R. G. Ferguson, Fort San.

"The treatment of typhoid in children by means of lysed vaccine"—Dr. J. M. Frawley, Fresno, Cal.

"The training in preventive medicine of the medical undergraduate"—Dr. J. G. FitzGerald, Toronto.

SECTION OF UROLOGY

Chairman—Dr. Emerson C. Smith, Edmonton;

Secretary—Dr. John Palmer, Calgary.

Friday, June 22nd

9.15 a.m.—"Arteriovenous aneurysm of renal pedicle"—Dr. Emerson C. Smith, Edmonton.

"Cystin nephrolithiasis"—Dr. Frank S. Patch, Montreal.

"Transurethral prostatic resection"—Dr. H. D. Morse, Winnipeg.

"Sarcoma of the prostate"—Dr. A. B. Hawthorne, Montreal.

Saturday, June 23rd

The delegates will be taken to Banff and the mountains. Free transportation will be provided for the delegates, who will look after their own entertainment. Luncheon will probably be at Banff Springs Hotel, \$1.50 per plate. Dinner, room and breakfast at the Chateau, Lake Louise, (American Plan), \$7.25 each with two in one room.

Other trips have been arranged. (1) to the Prince's Ranch; available any day, as requested by delegates, and return *via* Turner Valley if desired. (2) Stampede, Sarcee Reserve, at 3.00 p.m. on Friday. Free to everybody.

Transportation

Arrangements are being made for the use of Identification Certificates. Write to the General Secretary, 184 College Street, Toronto, for one. This permits you to purchase your transportation at the rate of single fare and one-third for the round trip. However, the railway officials advise us that, for all those travelling from centres east of Winnipeg, the summer tourist rate will be cheaper than the rate which could be secured by the use of the identification certificate. Before purchasing your transportation, will you, therefore, please take this matter up with your local agent.

Notices of Motion

1. The late Dr. F. N. G. Starr had given notice of motion that Chapter 4, Section 2, of the By-Laws of the Association be amended to read as follows:—

Where any section fails for any cause to appoint sectional officers for any year, it shall be in order for the Executive Committee to nominate officers for that section for that year.

2. Dr. J. S. McEachern has given notice of motion that the By-Laws of the Association be so amended as to permit of naming the place of the annual meeting at least two years in advance.

Hospital Service Department Notes

Convalescent Grants Arranged in Ontario

At the recent session of the Legislature the Ontario government so amended the hospital legislation as to provide that duly recognized convalescent hospitals in that province shall receive a *per diem* grant of 90 cents per patient-day from the municipality of which an indigent patient is a resident, and 30 cents per patient-day from the province for all patients for whom the convalescent hospital does not receive from other sources more than 90 cents *per diem*. These sums compare with 60 cents *per diem* (less a varying percentage) from the provincial government and \$1.75 *per diem* from the municipalities now paid to general public hospitals.

This recognition of the value of convalescent care is in keeping with the greatly increased general interest now being taken in this subject. More and more it is being appreciated that patients must be restored to full health and be made fit for work once more, not merely brought through the critical period and then allowed to relapse or recover as best they may. Governments and municipalities are now realizing that it is better and certainly more economical in the final analysis to get people back to normal working power rather than to sustain them indefinitely on public funds; moreover, it is being realized that in certain thickly populated urban areas it is cheaper to have patients pass their convalescence in a convalescent home than in a hospital for acute diseases. Unfortunately, very little provision for convalescent care or support has been made in Canada. This excellent and progressive step on the part of the Ontario government has been stimulated perhaps by the recent successful campaign by the Sisters of St. John the Divine (Anglican) of Toronto for funds to erect a much-needed addition to the adult convalescent facilities in that city and district; maintenance costs are being estimated at approximately \$1.95 per patient-day and these grants will be of material assistance in meeting these obligations.

Hospital Meetings in Europe

Hospital workers will be interested in a post-graduate course which will be held in Switzerland by the International Hospital Association in conjunction with the Swiss Hospital Association. This will be held during the period from August 15th to August 23rd of this year. It will be in the nature of a progressive study tour, the lectures and inspections starting at Basle and going on to Zurich, to Lucerne, Berne and to Leysin, where the delegates will be received by Prof. R. E. Rollier. En route numerous excursions to the mountains and on

the lakes will be made. Following the post-graduate course a study trip has been arranged to the Canton Grisons. The period until the 28th will be divided between sight-seeing, including mountain-climbing and motor trips, and lectures and demonstrations at various centres; at St. Moritz the Baths will be visited. Information can be obtained by writing to the Veska-Bureau, Obergrundstrasse 13, Lucerne, Switzerland, or from our sectional office.

Arrangements are now being made also for the Congress of the International Hospital Association which will be held in Rome in 1935 from May 5th to May 12th. This will be the fourth convention of this very active body, previous conventions having been held at Atlantic City, at Vienna and at Knoeke in Belgium. The Italian government is taking an active interest in the preparation of this program, and it is anticipated that there will be a large attendance from all over the world.

Hospitals Approved and Recommended for Internship

Attention is called to the fact that the list of hospitals approved and recommended for internship, which appeared in the April *Journal* on page 443, is not quite up to date, although certain additions to the list are noted on page 444, under the caption, "1934 Revision of Hospitals approved for Internship". It should be noted that the Hôpital de St. Sacrement, of Quebec, the Hôpital Notre Dame, of Montreal, the Hôpital Ste. Justine, of Montreal, the Woman's General Hospital, of Montreal, and the Vancouver General Hospital were raised to the approved list early in the year, and the Grey Nuns' Hospital, of Regina, was added to the recommended list.

Medical Societies

The Academy of Medicine, Toronto

At the annual meeting of the Academy of Medicine, held on May 3, 1934, the following officers were elected for the session 1934-35; *President*, Dr. M. H. V. Cameron; *Vice-president*, Dr. Oskar Klotz; *Honorary Secretary*, Dr. Gilbert Parker; *Honorary Treasurer*, Dr. James W. Ross; *Past-President*, Dr. E. A. McDonald; *Elective members of Council*: Drs. C. E. Cooper Cole, C. H. Hair, R. I. Harris, W. Loughheed, John McCollum, Robin Pearse, D. E. Robertson, J. R. Stewart, H. C. Wales, G. E. Wilson.

Chairmen of Sections: medicine, Dr. Julian Loudon; surgery, Dr. Dennis Jordan; pathology, Dr. Gordon C. Cameron; ophthalmology, Dr. Clarence E. Hill; oto-laryngology, Dr. J. N. Gardiner; preventive medicine and hygiene, Dr. Grant Cunningham; pædiatrics, Dr. C. V. Mulligan; obstetrics and gynaecology, Dr. W. Lailey; anæsthesia, Dr. John Chassels.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

The Leeds and Grenville Medical Society

At a meeting of the Leeds and Grenville Medical Society held in the Ontario Hospital, Brockville, on April 5th, Dr. John Hepburn, of Toronto, gave an address on "Hypertension". Dr. Hepburn stated that the systolic blood pressure which should be considered as normal should not be more than 145 degrees for any age. He emphasized the importance of the diastolic pressure as indicating the constant minimum strain from the blood vessels. He spoke of conditions with which hypertension was associated, and gave reports suggesting that the carotid sinus might be found to be of great significance in the regulation of the blood pressure. Dr. Hepburn sketched general and specific treatment with regard to the condition under discussion, but felt that there was no therapy which could be considered to be of significant value.

The Manitoba Medical Association

A meeting of the executive of the Manitoba Medical Association was held on April 26th with Dr. J. C. McMillan, President, in the chair. Dr. T. C. Routley and Dr. E. S. Moorhead were also present. Items on the agenda included reports of committees on the Workmen's Compensation Board, finance, radio-broadcasting, payment for services rendered to inmates of government institutions; the Debt Adjustment Act, extra-mural work and arrangements for the next annual meeting. There was a large attendance of rural members, and considerable discussion took place on the problem of medical relief in rural areas. ROSS MITCHELL

The Saint John Medical Society

The annual meeting of the Saint John Medical Society, held on the evening of April 25th at the Bungalow, took the form of a dinner. Reports for the past year were received. Dr. Joseph Tanzman, the retiring president, spoke briefly on matters of interest which had been handled during the year 1933-4. The election of officers for 1934-5 resulted as follows: *President*, Dr. J. P. McInerney; *Vice-president*, Dr. Wm. J. Baxter; *Treasurer*, Dr. R. T. Hayes; *Secretary*, Dr. F. C. Jennings; Additional members of the Executive, Drs. S. H. McDonald, A. B. Walter and A. E. Macaulay. A. S. KIRKLAND

The Toronto Biochemical Society

The 30th meeting of the Society was held in the lecture hall of the Banting Institute on April 19, 1934. The following communication is abstracted.

DISAPPEARANCE OF EXCESS FAT FROM THE LIVER,
by C. H. Best and M. E. Huntsman.

The results of researches which are reviewed in this communication justify the following conclusions.

1. Choline cures fatty livers when fat feeding is continued.

2. Choline accelerates the cure of fatty livers when fat is eliminated from the diet.

3. The choline contents of many diets may be an important factor in the prevention or cure of fatty livers.

4. On a choline-free diet fat does not disappear from the liver, but under-nutrition may play a part in this result.

5. There is a definite increase in the liver fat of animals placed on an exclusively carbohydrate diet which is deficient in total calories as well as in many dietary constituents. Choline prevents this increase in liver fat. This applies both to rats with fatty livers and to normal rats.

6. While fasting causes a transient increase in the fat content of the normal rat's liver, there is no increase if the livers have been made fatty previously by dietary means. Under these latter conditions there is a prompt decrease in liver fat and the effect of choline is not easily demonstrable.

The Winnipeg Medical Society

The regular monthly meeting of the Winnipeg Medical Society was held in the Medical College on April 20th. The evening was devoted to a symposium on "Tuberculosis in Manitoba". Dr. D. A. Stewart introduced the subject. He stated that the travelling clinics had begun in 1926 and since that time the clinics had accounted for 18,000 examinations of 14,000 people, of whom 11 per cent showed evidence of tuberculosis. Dr. E. L. Ross, Assistant Superintendent of the Manitoba Sanatorium at Ninette, spoke on the examinations of contacts and suspects. He emphasized the infectivity of tuberculosis and pointed out that the province was now a much safer place for children so far as the likelihood of developing tuberculosis is concerned. Dr. Herbert Meltzer spoke on tuberculosis in Indians and white children. He pointed out the risk Indians were in the tuberculosis problem. While the general mortality for tuberculosis in Manitoba was 58 per 100,000, the rate for treaty Indians was 828. The rate for those of mixed blood would probably be equally great. Dr. Charles Walton gave an analysis of racial incidence of tuberculosis in Manitoba from a study of vital statistics.

A jovial dinner was given at the Fort Garry Hotel on April 27th in honour of Dr. E. S. Moorhead and Dr. A. J. Swan who have acted as chairman and secretary respectively of the committee of the Manitoba Medical Association and the Winnipeg Medical Society dealing with medical care in unemployment relief. In the course of the evening a presentation of cheques was made to each as a slight token from the rest of the profession of Greater Winnipeg for their untiring work.

Special Correspondence

The London Letter

(From our own Correspondent)

The annual report of the Council of the British Medical Association contains this year a subject of wide professional and public interest in the shape of the report of the committee on medical education. Appointed in January, 1933, this body produced a valuable interim report for discussion at the Dublin meeting of the British Medical Association and, reappointed, it has now brought out a final document full of stimulating ideas. With the advice of educational authorities in the schools it is recommended that a post-matriculation period of two years shall be spent by all students before registration as medical students proper. During this time they are to continue to tackle the present subjects of chemistry, physics and biology (with more attention to the development of a true scientific spirit) and in addition they are to study other subjects of general education, usually English language and literature, a foreign language and perhaps history. Thus equipped with a broad cultural basis the student would enter upon a modified medical curriculum planned over four years. The principal changes suggested include the teaching of anatomy and physiology with more reference to the living body, the closer attention to minor operative procedures in medicine and surgery (*e.g.*, lumbar puncture and the opening of whitlows), instruction in nursing details, physiotherapy, manipulative surgery and psychological medicine, all of this to lead up to a final examination as at present. The most revolutionary changes are to follow this, for it is proposed that before registration by the State authorities as a medical practitioner the graduate shall spend a period of six to nine months as a resident, a clinical assistant, or in regular attendance at a recognized hospital, or, alternatively, as a pupil to a general practitioner or to a medical officer of health. This is but a brief summary of the proposals which in detail also contain valuable suggestions. There are certain other bodies also at present considering this question of medical education, but the British Medical Association committee's proposals are a fine lead to the reforms which are considered to be due.

The program for the 102nd annual meeting of the British Medical Association at Bournemouth, one of the loveliest of our south-coast towns, has now been issued in a preliminary form and contains much of interest. The section of medicine will discuss the problem of oedema as one of its subjects; a combined meeting

of public health and obstetric experts will deal with the question "Are we satisfied with the results of the ante-natal care?"; the great "barbiturate controversy" is to be continued in the neurological section by a discussion on the use of narcotics, while a useful survey of the present position is indicated in the radiological meeting with the subject "The value of radiology as an aid to the general practitioner". These are but a few of the titles chosen at random, and any visitors will be certain of an interesting time.

The establishment of paternity by means of the blood groups is beginning to appear in the courts and a recent case has raised the matter in an interesting form. A certain man had an affiliation order made against him in favour of Miss "B" in 1931. He refused to obey this and was committed to prison no fewer than 19 times in default of payment. Last February Miss "B" was found guilty of perjury as regards her evidence in the original proceedings. Unfortunately, nothing short of an Act of Parliament can undo the magistrate's original decision that the much-imprisoned man was the father of Miss "B"'s child. All that can be done is for Mr. "S" to appeal against that part of the order which deals with the monetary payment to be made. In appealing for this to be altered, the question of the blood-group test was raised and Mr. "S" offered to undergo any such test if it was legal. His representatives urged that out of 20,000 cases blood relationship had been established in 15,000 and negatived in 5,000. This is probably putting things too high, and in any case there is no legal authority to force the parties in such a suit to undergo any blood-grouping tests. The case is going before a higher court, and it would seem that it may have the effect of provoking some sort of ruling on this matter.

The radium "bomb", around which so much controversy has raged at different times, is before us once again in the shape of a report from the workers at the Westminster Hospital on the latest modifications designed to secure safety for the attendants and the best effects upon the patients. The current model contains two grams of radium and the channel in the block of lead now has gold at its lower end to prevent the leakage of rays and secure a real concentrated beam. The chief factors in protection are now reduced to the relatively simple terms, as mentioned in the report, of "distance and common sense". Radium sickness has largely disappeared with improved technique, and the results from, especially, carcinoma of the buccal, pharyngeal and laryngeal regions are encouragingly satisfactory.

ALAN MONCRIEFF.

121 Harley St.,
London, W.I.

The Edinburgh Letter

(From our own Correspondent)

The importance of a satisfactory environment in its relation to the health both of the individual and of the community is now fully appreciated. It has been said that what a man may be is determined by his inherited qualities, and that what he is is very largely the result of environmental factors. One of the most important of these factors is sanitation. The sanitation of Scotland has greatly improved during the past half century, and the diseases due to unsatisfactory environmental conditions have fallen very greatly in their incidence. This will result in more attention being paid to the genetic factors in their relation to health—a much more difficult and complicated problem. The cleanliness of the streets in the towns of Scotland, however, still leaves room for improvement. The introduction of more efficient methods of collecting street refuse has effected a considerable improvement, especially in the larger centres. The modern method of road construction has rendered it possible to wash the streets frequently, with a corresponding gain in cleanliness. The diminution in horse-drawn traffic has resulted in less organic pollution of the atmosphere, though the danger to health from the exhaust fumes of internal combustion engines is one to which some attention has been drawn. There is another aspect of the matter, apart from questions of public health, and that is the æsthetic one. Visitors to this country frequently complain that the streets are untidy on account of the amount of waste paper which is left lying about. Local authorities can obtain powers to make it an offense to drop litter on the streets, and a number of them are considering this matter. A great deal could be done by preventing the distribution of hand-bills in the streets, and by educating the public as to their responsibilities in the matter.

The financial position of Great Britain has improved greatly during the past two years. At the height of the economic difficulties in 1931 various classes of the community were called upon to suffer a temporary deduction from their usual rate of remuneration. Amongst these classes were the doctors engaged in National Health Insurance work. It stands to the credit of the profession, that when asked by the Government to accept a deduction of 10 per cent from their capitation fees this was at once assented to by the Insurance Acts Committee of the British Medical Association, as the Central Body representing insurance practitioners. In introducing his budget in the House of Commons on April 17th, the Chancellor announced that on account of the improved financial position of the country it was the intention of the Government to reduce the deduction to 5 per cent, as from July 1, 1934.

The annual sum represented by the 10 per cent cut was considerably over £80,000.

The post-graduate courses in medicine to be held at Edinburgh University this summer commence on July 16th. The course in obstetrics, gynæcology, and child life and health lasts from July 16th to August 11th. A course for general practitioners will be held from August 13th to September 8th. This course includes applied anatomy, clinical medicine, clinical surgery, infectious diseases, clinical gynæcology, child life and health, diseases of the eye, diseases of the ear, nose and throat, and dermatology. A general surgical course, to be held concurrently with the former, will include applied anatomy, general surgery, diagnosis and treatment of renal disease, abdominal surgery, gynæcological operations, orthopædics, surgical pathology and physiology, venereal diseases and radiology. Limited courses will also be held on such subjects as modern diagnostic methods, diseases of the blood, endocrinology, diseases of the nervous system, urology, x-ray physics, ultra-violet radiation, ophthalmoscopy, urological surgery, neurological surgery, and other subjects.

The medical service in the Highlands and Islands of Scotland is one of the most satisfactory health services in the world today. Prior to the institution of this state-aided service in 1913 the medical attendance on persons of the crofter and cottar classes was very inadequate. One of the reasons for this was that the doctors in the Highlands and Islands area were very poorly paid, and good professional men hesitated to accept appointments under the conditions then existing, which involved their living in isolated places, far from civilization, with no security of tenure, and where they might find themselves finally stranded in penury with their wives and families. From the people's point of view, it was difficult for a poor crofter or fisherman to secure medical treatment unless he lived quite near the doctor. There were many cases of illness which received no medical attention, and this was partly due to the fact that the people were so poor that they could not pay even a small fee, much less an adequate fee where the doctor had to travel a considerable distance. There was also in many areas a lack of means of communication with the doctor. Now the Department of Health for Scotland makes a grant to all the doctors in the area, based largely on the estimated mileage the doctor will require to travel in attending to the needs of the patients who come within the scope of the scheme. In addition the doctor is entitled to charge a fee of 5/- for a first visit and 3/6d. for each subsequent visit. For the treatment of necessitous cases the respective Public Assistance Committees give a fixed salary to the doctor. The effect of these pro-

visions has been to give the people a really efficient medical service. The nursing service is subsidized. There is adequate hospital provision; the telephone and ambulance services are, except in one or two of the more inaccessible places, satisfactory; and the doctors have access to diagnostic facilities and the aids afforded by laboratory investigations. There is a special Highlands and Islands Sub-Committee of the British Medical Association which is charged with the duty of supervising the efficient working of the service.

R. W. CRAIG.

7 Drumsheugh Gardens,
Edinburgh.

Topics of Current Interest

Contrasting Trends in Heart Disease

The heart disease situation today, serious as it is, has certain favourable aspects which merit attention. One of the most encouraging is the consistent and prolonged decline in the mortality from chronic valvular heart disease, a decline which has affected every age, both sexes, and negroes, as well as white persons. The rate of fall has been greatest among young persons, with current deathrates at ages under 25 barely half what they were in 1921-1922, and in the first decade of life approximately one-third their level of twelve years ago. Between ages 25 and 44 there has also been substantial improvement. Among men of these ages, the mortality from valvular disease has fallen about 20 per cent, and among women, over 25 per cent. The rate of fall at these ages has been slightly greater for negroes than for white persons. Even past 45 years of age there has been extensive and steady improvement in the recorded mortality from these diseases of the heart. The rates have declined more than one-third among white persons and more than one-fifth among the coloured.

The decline in deathrates from valvular heart disease is encouraging, because, up to age 50, chronic heart disease is chiefly of this type and results largely from bacterial invasion. The chief offenders are the organisms causing rheumatic fever, syphilis, and, to a less extent, the communicable diseases of childhood. The deathrates from all three have been steadily declining, and we may infer that this largely explains the fall in mortality from chronic disease of the heart valves, although no satisfactory statistical proof of this relationship has yet been furnished.

In marked contrast with these favourable trends is the increasing mortality from diseases of the heart muscle. Even among young persons, where chronic heart disease of this type is infrequent, there has been a slight rise. Between the ages 25 and 44 the increases have been

enormous. The rate for white men at these ages has doubled and that for white women has risen by nearly two-thirds. The rate for negro men has tripled and has almost doubled for coloured women. In middle life and old age, also, there have been large increases in rates for myocardial disease. Among white men between ages 45 and 74, deathrates from myocardial disease have doubled and among women have gone up by 75 per cent. Among coloured persons in this period of life, current levels of myocardial deathrates are more than two and one-half times their level of twelve years ago.

Myocardial diseases are to a much lesser degree a result of infectious processes than are the valvular diseases. Consequently, the deathrate from these conditions can benefit little, if at all, from the conquest of diseases of bacterial origin. A large part of myocardial disease is an inevitable and natural process of advancing age, often hastened, it is true, by destruction of heart tissues as a result of infection. Senescent changes take place in practically every part of the body, but many of them are hardly more than symptomatic and have no effect on longevity, as, for example, the loss in keenness of vision or hearing, and the increased brittleness of the bones. In the heart, however, these changes are serious. On the one hand, they may limit the efficiency of the heart and result in its eventual failure. On the other, senescent changes, directly or indirectly, may result in injury to the muscle wall, as in infarction or thrombosis—types of accidents which in the heart are usually fatal, but in many other parts of the body often prove of little consequence.

From the point of view of control of heart disease there is every reason to look forward to a continued improvement in the mortality from the valvular conditions. In contrast, little may be expected in the way of a reduction of deaths from the myocardial diseases. But this need give us little concern, for they result largely from the inevitable breakdown of the organism with advancing age, and as a greater proportion of persons is surviving today to higher ages it necessarily follows that more will suffer from breakdowns of this type. The heart picture, therefore, on the whole, is far from discouraging.—Statistical Bulletin, Metropolitan Life Insurance Co., 1933, 14: 8.

The Certification of Specialists

At the last annual session of the American Medical Association a resolution was adopted authorizing the Council on Medical Education and Hospitals to express its approval of such special examining boards as conform to standards of administration formulated by the Council and urging the Board of Trustees to use the machinery of the American Medical Association, including the publication of the

Directory, in furthering the work of such examining boards as may be accredited by the Council. Pursuant to that action, the Council is beginning with its task of designating and classifying the specialists of the United States. Arrangements have been made in the publication of the next edition of the American Medical Directory to indicate those physicians who hold the certificates of some of the boards already established, and also to describe the nature of the boards which will be considered acceptable by the Council. Already certifying boards have been established in the fields of ophthalmology, otolaryngology, dermatology, and gynecology and obstetrics, and boards are said to be forming in the fields of roentgenology and orthopaedic surgery. Moreover, there is some evidence of a desire to establish a special board in the field of general surgery, a board in which the section of the American Medical Association and representatives of the leading surgical associations should have a part.

In the meantime, as a result, no doubt, of suggestions made at a hearing before the reference committee of the House of Delegates at the meeting in Milwaukee, the certifying boards already established have organized among themselves an advisory board which, it is presumed, will serve to coordinate the activities of the several boards, standardizing their methods of work and advising with them in their operation. The functions of this coordinating board are clearly to aid in the practical operation of the boards rather than to define their methods of work or to sit in judgment on the results of their operations. That, clearly, according to the resolution adopted by the House of Delegates of the American Medical Association, is to be the function of the Council on Medical Education and Hospitals. As an independent body, the purpose of which will be to maintain the operation of the certifying boards in the specialties at a high level both as to standards adopted and as to conduct, the Council on Medical Education and Hospitals could hold no representation on this coordinating board. It may, of course, advise with the coordinating board at such times as its advice may be sought. It would hardly be in order for a body sitting in judgment to hold membership on a board whose work it was expected to judge.

The machinery of the American Medical Association in support of the work of the certifying boards has already begun to function to some extent. The mere description of the boards in the American Medical Directory and the listing of those who hold the certificates is in itself a vital step in making effective the advancement of the specialties concerned. Beyond this, however, the American Medical Association has broadcast over the radio, through newspapers, and, to some extent, through its periodical

Hygeia a description of the certifying boards and a statement as to the significance of their certificates. As information concerning the work of these boards becomes more widely disseminated among both the medical profession and the public, their prestige must grow. Eventually the young man who wishes to make for himself a place in any of these specialties will consider the securing of a certificate by a council-recognized certifying board as the first step in such a procedure. Hospitals will also do well to be guided in their staff appointments by similar qualifications.

Movements of this type necessarily develop and advance slowly. However, with the qualifications and restrictions that have been outlined, there is reason to believe that the certifying boards will do much to advance the quality of specialistic service available to the people and to the profession of our country.—*J. Am. M. Ass.*, March 31, 1934.

The New Note in Science

Sir Charles Sherrington's expression of opinion in a recent lecture on the brain, that any unicellular conception of mind has grown unattractive, is a further indication of the change which is now taking place in the outlook of physiologists and biologists, to say nothing of physicians. It is a change comparable in many respects to that which has occurred in the views of physicists and chemists and finds its expression in the abandonment of the materialistic hypotheses of the nineteenth century. As knowledge of physical process and physical law increases, the tendency to explain the whole universe, including the human mind, in terms of such knowledge tends to weaken and to give place to the attitude which some of the pioneers of scientific research, and notably Pasteur, adopted and resolutely maintained. Pasteur refused to be drawn into discussions about the bearing of his studies on philosophical speculation, urging that the methods of experimental science could not properly be used outside of that narrow sphere. His devout mind remained wholly untroubled by arguments the basis of which was often his own work. That most of these arguments have long since been abandoned in the light of further knowledge is a tribute to his wisdom.

His conception of life as reaction capable of very wide modification approximates closely to that of many present-day biologists. Sir Charles Sherrington insisted that it is the outside world which sets the activity of the brain in motion. But the nature of this activity and its quality depend, as he indicated, on numberless and often obscure conditions. The elements of individual choice and affection, of character, in short, are thus excluded from the field of physiology. It seems unlikely that any leader in other fields of

experimental science will wish to lay claim to them. The time is past in which resemblances between behaviour and the products of an automatic machine can easily be recognized or demonstrated. Such resemblances, as is now becoming apparent, were misconceived. The brilliant bio-chemical researches which, in recent months have afforded a new understanding of those chemical messengers which exert influence throughout the body would almost certainly have been hailed half a century ago as a final demonstration of the materialistic theory. It is significant that their publication, which continued throughout the past year, has been attended by no such display of faulty logic.—*The Weekly Times*, Jan. 4, 1934.

Abstracts from Current Literature

Medicine

The Diagnosis and Medical Treatment of Angina Pectoris. White, P. D., *Ann. Int. Med.*, 1933, 7: 218.

The term angina pectoris should be confined to a strangling or pressing sensation (not a stabbing pain or an ache) under the sternum, occurring paroxysmally as the result of exertion, excitement or other stimulus, and subsiding within a few minutes under the influence of rest or of nitrites. Almost the rarest site of true angina pectoris is the præcordium itself in the region of the cardiac apex. When radiation occurs, the sense of oppression becomes modified to a burning, tingling or numb feeling. It has been almost conclusively proved that the symptom is due to a temporary coronary insufficiency. The underlying cause may be coronary arterial sclerosis, luetic aortitis, vasoconstriction of the coronary arteries, or marked aortic regurgitation or stenosis. Angina pectoris occurs most readily in persons with nervous hypersensitivity. Severe anæmia and thyrotoxicosis favour the onset of angina pectoris, but are not believed to cause it in perfectly sound hearts.

The diagnosis is wholly dependent on the patient's history, unless one happens to observe a typical attack and note its relief by rest or nitrites. About one-fifth of all cases show no abnormalities of the circulation on physical examination, roentgen-ray study, or electrocardiography. The pain of angina pectoris should not be confused with the dull prolonged heartache or sharp stabbing knife-like or pins and needles pains of neurocirculatory asthenia. The pain of coronary thrombosis is exactly like that of angina pectoris except that it is more

prolonged, lasting hours instead of minutes. The so-called aortic pain, pericardial and pleural pain, the pain of peptic ulcer and of gall-bladder disease, and chest pain due to gaseous distension of the stomach or colon, may at times cause confusion in the differential diagnosis of angina pectoris.

The medical treatment consists of rest in the sitting position and nitroglycerine or amyl nitrite during the attack, and proper regulation of rest, exercise, and habits of eating between attacks. Foci of infection may require special attention, and every means should be taken to improve the general health. Luetic aortitis, if present, should be carefully and thoroughly treated. Nitroglycerine may be given prophylactically, but as a privilege not to be abused, to permit the accomplishment of necessary exertions. A healthy optimistic attitude of mind must be constantly maintained by the doctor and inculcated in the patient.

H. GODFREY BIRD

The Rheumatic Lung. Howard, C. P., *Ann. Int. Med.*, 1933, 7: 165.

Pleurisy is, next to carditis, the most common complication of acute rheumatic fever. A pleurisy is found in the majority of cases that come to autopsy in either the acute or subacute stage of the disease. It is a specific inflammatory lesion similar to that of rheumatic pericarditis or arthritis, and is part of the generalized rheumatic process and not the result of direct extension from the pericardium. It may be most extensive when complicating a widespread mediastinitis and is then usually associated with an effusion. Small isolated patches will escape recognition on physical examination. Pneumonia may appear at about the same time as the acute cardiac manifestations of acute rheumatic fever. The physical signs are much more striking than the symptoms. There is no preceding upper respiratory infection, no chill, high fever, rusty sputum, severe pleural pain or tachypnoea. Dullness and bronchial breath sounds are transient in character, and may be present for only two to four days. They may recur in the same area in a few weeks. Massive pulmonary collapse or pleural effusion may occur.

According to Eiman and Gouley, and also Naish, the pulmonary lesion of rheumatic fever is an acute interstitial inflammation, having as its basis the vascular damage and perivascular infiltration that are common to all rheumatic lesions. The colour varies from a dark blue to a rusty brown, and there is a delicate white tracing under the pleura due to the interstitial exudate. The cut surface is dark red, firm, finely granular and slightly moist. The consistency is that of india-rubber. The extent of the consolidation may be great, all five lobes having been found involved.

H. GODFREY BIRD

Chronic Adrenal Insufficiency: A Hitherto Undescribed Syndrome: With Case Report.

Packard, M. and Wechsler, H. F., *Am. J. M. Sc.*, 1933, 186: 66.

The authors report the case of a Hungarian of fifty years, hospitalized because of a generalized œdema due to prolonged malnutrition. As a result of a high calorie, vitamin B-rich, salt-poor diet, his œdema and hydrothorax rapidly disappeared and he developed a voracious appetite. The improvement, however, lasted only ten days, after which profound anorexia and rapid and extreme emaciation supervened. Within a month, in spite of forced feedings and glucose and calcium gluconate intravenously, the patient became cadaveric in appearance, with multiple decubitus ulcers. The panniculus adiposus had universally and completely disappeared. A moderate secondary anæmia was present. The blood pressure was well sustained, about 154 systolic and 88 diastolic. Athetoid movements appeared; he became irrational and stuporose and died. Autopsy revealed atrophy of all the internal organs and a complete absence of fat from the skeleton and organs. The striking and interesting lesions were located in the adrenal glands, which were larger than normal. The right weighed 9.2 g. and the left 8.7 g. This increase in size was not due to hypertrophy but to an advanced degenerative lesion of both adrenals, with necrosis, regeneration, hæmorrhages and capillary and venous thromboses. The authors compare this picture of extreme emaciation, complete loss of body fat, asthenia, anorexia, polyneuritis, trophic ulcers, absence of pigmentation, and hypotension with experimentally produced chronic adrenal insufficiency in animals. The two are identical. The authors, therefore, feel justified in concluding that the clinical syndrome in the case described is one of chronic adrenal insufficiency due to adrenal degeneration occasioned by malnutrition.

E. S. MILLS

Surgery

Prolapse of the Rectum. Rankin, F. W. and Priestley, J. T., *Ann. Surg.*, 1933, 98: 1030.

Prolapse of the rectum has been classed as (1) prolapse of the rectal mucous membrane; (2) prolapse of the rectum proper (procidentia), and (3) intussusception of the recto-sigmoid.

Prolapse of the rectal mucous membrane occurs when the small ring of mucosa which normally protrudes from the anus during defæcation fails to return. Straining or diarrhœa accentuates the protrusion. The mucosa becomes redundant; the submucosa is stretched and relaxed; the other layers of the rectal wall remain unaltered. This condition is not a true prolapse. It is commonest in childhood and old

age. It is most prone to develop in poorly nourished children, particularly after debilitating diseases. Constipation and diarrhœa predispose to its development. Intestinal parasites, whooping-cough, rectal polyps, and measles are the more commonly associated conditions. Diarrhœa of any origin is the commonest single etiological factor. Numerous anatomical hypotheses have been advanced, but only rarely is any developmental defect observed which is directly responsible for the prolapse of this type.

Diagnosis is usually obvious on inspection. The colour of the rosette of mucous membrane depends on its blood supply, ranging from pink to the black of complete strangulation. This complication is rare in this type of prolapse. In long-standing cases the tissues may be pale and leathery, and they tend to bleed readily. In this type it is impossible to insert the finger into the rectum lateral to the mass.

Treatment may be medical or surgical. In the early case non-operative measures may effect a cure. Known etiological factors must be eliminated. Medical treatment consists of (1) eradication of local causes; (2) establishment of normal bowel habits, and (3) general hygienic care, and treatment of any coexisting disease. Readjustment of the bowel function may be accomplished through attention to diet and the use of appropriate lubricating oils. Violent purgatives should not be used. Locally, the prolapse, following cleansing with warm water and oiling with olive or paraffin oil, should be gently reduced after each defæcation. Position is maintained by strapping the buttocks firmly together. Excessive straining should be avoided. An aid to this is the use of the horizontal position while at stool. A successful result may be obtained by injecting absolute alcohol into the submucosa. One c.c. is used, one-quarter of it being injected at each of 4 equidistant points around the anus. The buttocks are strapped for 24 hours. The bowels are then opened. Excision is one of the surest methods for effective cure.

Procidentia is characterized by the presence of all layers of the rectal wall in the protrusion. Two types are recognized; one starts below the peritoneal reflection, the other above. There is no marginal sulcus in the former. The latter is representative of true rectal prolapse. It almost always occurs in adults. Etiological factors are obstinate constipation, incessant diarrhœa, and trauma incident to parturition. Prolapse of the rectum is similar to a sliding hernia. The clinical features are a protruding mass associated with obstipation, and in advanced cases with incontinence. The protrusion varies from a few inches to one of considerable length. Early, manual reduction is possible; later, it is followed by immediate recurrence. In long-standing cases the mucosa is œdematous and one or more areas of ulceration may be present. A constant secretion of mucus is an

irritating feature. Pain is not a prominent feature. Treatment may be medical or surgical. Medical treatment is of value only in the early cases. It consists in (1) soothing ointments, (2) submucous injections of astringents, (3) mechanical supports, and (4) electrical treatments. Numerous operations have been devised. Moschowitz advocated obliterating the cul-de-sac of Douglas, and this operation is favoured by the authors. After operation a low residue diet is given.

Intussusception of the recto-sigmoid is not a true prolapse. It is treated as in the type just described.

STUART GORDON

Use of Rib Grafts for Fusion of the Spinal Column. Bisgard, J. D., *Arch. Surg.*, 1933, 26: 796.

In 1924, Gutierrez made the first reference to the use of rib grafts for fusion of the spine. He obtained good results in 6 cases of vertebral tuberculosis. It is generally agreed that spongy bone, such as that of the rib, is replaced by new bone sooner after transplantation, and more rapidly than dense cortical bone, as from the tibia. A summary of a group of 12 patients, 4 with vertebral tuberculosis and 8 with scoliosis is given. In each of these rib transplants were used. In each a solid bony-fusion was demonstrated clinically and by roentgen examination three months after operation. The operation has usually been performed, at the University of Chicago Clinics, in two stages, with a two weeks' interim.

There are certain advantages in the use of rib segments for spinal implantation: (1) the grafts are accessible in the same general field of operation; (2) the curve of the rib at its angle frequently is more adapted to the contour of the spine in cases of kyphosis and scoliosis; (3) there appears to be less shock than that associated with the removal of a tibial graft; (4) as described by Whitman, the resection of the ribs may serve a dual function in cases of scoliosis with rotation deformities of the chest.

G. E. LEARMONTH

Epidermoid Cysts of the Spleen. Shawan, H. K., *Arch. Surg.*, 1933, 27: 63.

The author records the case history of the rarely reported megalosplenic cyst and reviews the cases so far described in the literature.

His patient was a girl, aged 16, who complained of a gradual enlargement of the upper left part of the abdomen during the preceding two and a half years. There was occasional slight local pain, referred to the left shoulder. During childhood she had a severe injury to her left side. Roentgen examination showed the stomach and the lower part of the esophagus to be crowded over toward the right side beyond the midline. Due to the palpable

mass in the left side of the abdomen there was a rounded incurving on the greater curvature of the stomach. The splenic flexure and the transverse colon were displaced downward by the mass on the left side. At operation 1,500 c.c. of fluid were removed from the cyst. The spleen, together with the collapsed wall of the cyst, was removed. This patient made a good recovery. Nine years after the operation she was in good health. The pathological report stated that this cyst had an inner lining of different degrees of stratification. The inner wall of the cyst beneath the remnant of the spleen presented numerous tendon-like ridges and trabeculae, between which were found recesses and niches. Microscopically, the inner walls of these recesses adjacent to the spleen were lined by stratified squamous, epidermoid tissue. The author offers two alternative theories to explain the ontogenesis of these tumours: (a) embryological displacement, or (b) autochthonous formation, where it is postulated that the mesoderm has the ability to form the products of any of the other two primary germinal layers.

G. E. LEARMONTH

Obstetrics and Gynæcology

Changes in the Urinary Tract During Pregnancy. Strumpf, T. J., *Am. J. Obst. & Gyn.*, 1933, 26: 857.

In Strumpf's study 50 healthy primiparae were chosen who were free from any indication of kidney disease and gave no history of previous kidney disease. Intravenous pyelography was used exclusively, neo-iopax being employed on account of the smaller bulk of injected material (20 c.c.). X-ray pictures were taken five minutes and twenty minutes after injection. The most striking finding was the almost constant distension or dilatation of the urinary conducting system, some deviation from normal occurring in 92 per cent of cases. Neither the presentation nor the position of the fetus in the uterus had any connection with this dilatation; neither had the constitutional habitus of the individual, nor the pressure of the fetal head, nor the tenseness of the abdominal wall. One must be impressed by the fact that the organs involved in the hypertrophy of pregnancy, i.e., the uterus, round ligaments, pelvis of the kidney, and ureters, are supplied by autonomic nerve fibres from the same segments of the cord and from the same nerve plexuses, and that these plexuses are known to undergo refinite enlargement and hypertrophy during pregnancy and involution following its termination. These ureters in pregnancy are undoubtedly dilated and displaced. It is not consistent with the usual course of events to assume that after having been subjected to such marked dilatation, in

some cases for six months, without symptoms of any kind, these structures can involute to normal size and shape within a period of hours or days if the process were not physiological rather than pathological.

ROSS MITCHELL

Sickle-Cell Anæmia in Pregnancy. Lash, A. F., *Am. J. Obst. & Gyn.*, 1934, 27: 79.

Dresbach in 1904 was the first to report a case of sickle-cell anæmia, and Herrick described the condition quite completely in 1910. The condition is rare and only 2 cases have been reported outside of the United States. It is a familial disease, appears to be transmitted by the Mendelian law, as a dominant factor, occurs more frequently in males and chiefly in young people and negroes. The change from round to sickle cells occurs in the organs of the reticulo-endothelial system, especially in the spleen and to a marked extent in the bone marrow and the liver. The essential pathology is found in the spleen, the bone marrow and the liver. Symptoms of the disease are repeated attacks of weakness, jaundice, fever, and abdominal or articular pain. The average blood count is from 2,000,000 to 2,500,000; the hæmoglobin averages 40 to 50 per cent. Nucleated red cells are generally seen, and the percentage of reticulated red cells is increased to from 10 to 15 per cent. Sickle cells are present in 0.5 to 4 per cent of the cells actually present in the blood stream, but moist preparations of fresh blood, incubated for from six to twenty-four hours, show from 50 to 100 per cent sickle cells. There is a moderate leucocytosis, polymorphonuclears predominating. The liver diet appears to offer more hope than any other treatment known at present.

A case of full-term pregnancy occurring in the course of an active or activated sickle-cell anæmia is described. Death followed a long labour and a Cæsarean section in six hours. The spleen weighed 960 g. The baby survived and showed sickle cells in moist preparations of the fresh blood after twenty-four hours.

ROSS MITCHELL

Concerning Placental Hormones and Menstrual Disorders. Campbell, A. D., *Ann. Int. Med.*, 1933, 7: 336.

Placental hormones used in the treatment of menstrual disorders are first, emmenin, an alcohol-soluble extract, relatively inactive in castrates, and secondly, anterior pituitary-like hormone, (A.P.L.) insoluble in 85 per cent alcohol, destroyed by digestive enzymes, and, therefore, given by injection.

Emmenin is converted by the ovaries into some more active form of oestrin. A.P.L. acts on the pituitary gland, stimulating it to increased activity, and causing release of the required complementary substance. Emmenin

and A.P.L. are of use only where there are no pelvic abnormalities, and where there are no dietary faults. Amenorrhœa, due to damage of the pituitary body, cannot, of course, be affected by A.P.L., nor, will menorrhagia, due to some pelvic lesion, be improved by either hormone. The hormones are useless, also, in the treatment of intermenstrual pain associated with ovulation. On the other hand, secondary amenorrhœa, and dysmenorrhœa due to prolonged action of the corpus luteum respond excellently to emmenin, and the menopausal syndrome is relieved by A.P.L. in cases in which the ovaries are intact.

E. S. BIRD

Pædiatrics

The Age of Choice for Operation of Choice in Infancy and Childhood. Lanman, T. H., *J. Pæd.*, 1934, 4: 107.

The author bases his opinion on the experience of the surgical service of the Children's Hospital, Boston. Surgical procedure in the first two years of life should be postponed whenever possible unless the condition requiring operation is not compatible with the normal development of the child. Dangers such as hæmorrhage, prolonged anæsthesia, loss of body heat and post-operative acidosis are very real in infants and small children. Operations should be planned with regard to the seasonal incidence of upper respiratory infections. The author's opinion as to the optimum age for the following operations is expressed in detail: hernia, hydrocele, hare lip, cleft palate, spina bifida, undescended testes, hypospadias, web fingers, birth marks, circumcision.

ALAN ROSS

Hodgkin's Disease in Children. Smith, C. A., *J. Pæd.*, 1934, 4: 12.

The author has collected 85 cases of Hodgkin's disease in children and reports 23 additional ones. Like leukæmia and lymphosarcoma, Hodgkin's disease predominates in the male during childhood. No relation to foci of infection or illness can be traced. Secondary invasion with tuberculosis is fairly common in children. There seems a tendency for the tuberculin test to be negative in the presence of Hodgkin's disease. None of 5 cases treated with avian tuberculin gave a positive reaction. Two-thirds of the author's patients were symptom-free at the onset. In the others, loss of appetite, weight, and strength were complained of. At the onset 92 per cent. showed cervical involvement, 4 per cent mediastinal or abdominal, and 2 per cent axillary. Blood studies are not characteristic, but a progressive anæmia is uniformly present in the fatal cases. The average duration of 16 fatal cases was 3.45 years. One patient is alive and well 12 years

after onset. Though ultimate benefit from roentgen irradiation is difficult to evaluate, its effect in many cases is most striking. It is recommended and a program suggested.

ALAN ROSS

Therapeutics

A Case of Combined Sclerosis Without Anæmia Treated by Intensive Iron Therapy. Sargant, W., *Brit. M. J.*, 1933, 1: 1100.

Dr. Sargant's work on the treatment of subacute combined sclerosis with massive iron therapy has been largely under Dr. Wilfred Harris' observation and Dr. Harris considers it a most important advance in neurological therapeutics. Complete achlorhydria is more constant than anæmia as an accompaniment of this disease. Paræsthesiæ in the limbs, followed by ataxia, are, if accompanied by achlorhydria, diagnostic of subacute combined sclerosis, even in the absence of anæmia and of spastic phenomena. In two of Dr. Harris' cases under this treatment the blood counts were normal; in all the cases, improvement after a few weeks' treatment was very marked. He considers that the nervous degeneration in the cord is in some way dependent upon deficient iron metabolism which, again, may in part be associated with achlorhydria. Since the latter may be present for years, with perfect health, some hitherto unrecognized factor must also be concerned in the iron deficiency and the consequent nervous degeneration.

The case here reported is that of a man of 37, with two years' history of paræsthesiæ, etc., who on admission showed great weakness, ataxia, exaggerated knee and ankle jerks and extensor plantar responses. There was complete achlorhydria but no anæmia. The patient was observed for five weeks in hospital and before treatment commenced was quite bedridden. The only treatment was 150 grains of Bland's pill, by mouth, daily. Improvement was continuous; in ten weeks he was walking without support, and now, six months later, the ataxia is scarcely noticeable. The extensor plantars have of course persisted. The patient is still taking 100 grains of Bland's pill daily.

It is suggested that other less marked examples of nervous degeneration without anæmia may exist, untreated, and test meals are advised in all doubtful cases. The use of iron therapy in other diseases showing nerve involvement, associated with alimentary disturbance, as in pellagra, is also suggested.

W. FORD CONNELL

Hay Fever: The Mechanism of Specific Desensitization. Harley, D., *The Lancet*, 1933, 2: 1469.

Ten cases of hay fever due to the pollen of grasses are used as a text in discussion of the

mechanism of desensitization as a whole. The views of leading authorities are cited in respect to the relation of skin sensitivity to general tissue desensitization and the presence of reagin in the blood serum. The skin tests were carried out by the "prick" method of Lewis, and the 10 cases treated with pollen extract in much more massive dosage than that recommended by many writers. The skin sensitivity is proportional to the reagin content of the serum and can be abolished completely if sufficient dosage of allergin is given. The reagin content of the serum was markedly reduced in all cases and in some disappeared completely. The mechanism is believed to be that of a slow allergic reaction between the allergin introduced and the reagin in sensitized tissues, which, with frequent massive dosage, first neutralizes the stores of fixed reagin and later the circulating serum reagin, so that the whole organism is eventually completely free of reagin and is then "desensitized,"—it is hoped permanently. When this is achieved reagin is no longer present in the serum and skin sensitivity is abolished. A total dosage of as much as 500,000 units is the calculated amount of extract necessary in such a course of therapy. Less than this results in incomplete desensitization. The patients were given injections either five days a week or daily, and 8 of the 10 long-standing cases obtained complete relief, while the remaining 2 showed marked improvement. It is suggested that failures in the past have been due to inadequate massive dosage of extract. Many of the patients conducted their own treatment.

J. B. ROSS

The Treatment of Chronic Intractable Asthma with Pollen Extracts. Waldbott, G. L., *Ann. Int. Med.*, 1933, 7: 508.

Relatively little stress has been laid on the treatment of chronic asthma due to pollen, because of the difficulty of recognizing the apparent paradox that in a patient who has been wheezing continuously for many years the asthmatic condition may have originated from seasonal pollen asthma, or pollen hay fever. In 121 consecutive cases of chronic perennial asthma the author found 65 in whom the date of the initial attack could be determined. Of these, the asthma started during the local pollen season in 83 per cent.

The author has repeatedly noted that pollen asthmatics, even in pollen-free rooms, continue to have asthma for two or three weeks after the disappearance of pollen from their surroundings. He suggests that chronic asthma often starts with a primary pollen sensitization, and is perpetuated by infections or secondary sensitizations.

He treated 26 of the group of 121 with a mixture of short and long ragweed, timothy,

June, and orchard grass, and other pollens that might be indicated by skin testing. He started treatment at any time of year, aiming only to have reached a maximal dose if possible before the onset of the pollen season.

The 26 selected for treatment were of the most severe and chronic type and had been under continuous medical care for the twelve months previous to starting this treatment. Of the 26 for the past two years 6 have been entirely free of attacks, 9 have had a few minor attacks, 7 are considered to be improved, and 4 had no relief.

The good results are explained on the grounds that: (1) control of the major sensitivity enables the patient to bear the lesser sensitivities; and (2) prevention of nasal infection, by avoidance of seasonal irritation, has a favourable influence upon the asthmatic state.

T. G. HEATON

Radiology and Physiotherapy

Significance of Roentgenological Changes in Differential Diagnosis of Atelectasis. Manges, W. F. and Farrell, J. T., Jr., *Am. J. Roentgenol.*, 1933, 30: 429.

Atelectasis may be local or general, congenital or acquired. Congenital atelectasis is uncommon. It is usually lobar. Failure of the respiratory mechanism is generally considered to be the cause. Acquired atelectasis is always due to complete occlusion of a bronchus with the absorption of air distal to the occlusion. The roentgenological characteristics of atelectasis enables us to differentiate it from other conditions. The roentgen phenomena fall into two classes: (1) increase in the density of the shadows of the involved portion of the lung; (2) displacement of the heart and other mediastinal structures toward the side of involvement, with elevation of the diaphragm on the affected side.

Acquired atelectasis may be (1) intrinsic, due to a foreign body, a bronchial neoplasm, post-operative massive collapse, pneumonia, tuberculosis and asthma, and is due to intrabronchial plugging; (2) extrinsic, due to enlarged tracheo-bronchial lymph nodes, aneurysm, mediastinal new growth, and extra-bronchial pulmonary new growth, and is caused by occlusion of the bronchus by extra-bronchial pressure.

Bronchiectasis is closely associated with atelectasis, and bronchiectasis and abscess frequently follow atelectasis due to aspirated foreign bodies and bronchial neoplasm.

Post-operative atelectasis, pneumococcal atelectasis, and atelectasis in asthma usually resolve without serious sequelæ and without recognizable residues, roentgenologically.

Displacement phenomena accompanying abscess strongly suggest a neoplastic origin for the abscess, because they indicate that atelec-

tasis preceded it, a rare condition in non-neoplastic abscess. Atelectasis, while rare in extra-bronchial lesions, is a grave prognostic sign. When due to pressure from an extra-bronchial pulmonary new growth it is of less serious import.

A. STANLEY KIRKLAND

Treatment of Benign Uterine Neoplasms, with special reference to radium. Norsworthy, O. L., *Am. J. Roentgenol. & Rad. Ther.*, 1933, 29: 516.

In the treatment of benign uterine hæmorrhages, radium meets all the indications except that of impairing ovarian function. In women over thirty-five its possibilities should always be considered. It is indicated as follows: (1) in small neoplasms accompanied by hæmorrhage; (2) in selected cases of large neoplasms; (3) in operative cases where the patient is too ill for a major abdominal procedure. Radium will control hæmorrhage; it will produce the menopause; it will arrest the growth of the neoplasm, and in a large majority of cases will cause its complete disappearance. It may also be used to check temporarily excessive menstruation.

E. E. SHEPLEY

Oto-Rhino-Laryngology

Vertigo. Brain, W. R., *J. Laryn. & Otol.*, 1934, 49: 153.

Vertigo is best defined as the sensation of a disordered orientation of the body in space. The orientation of the body in space depends on the integration by the nervous system of afferent impulses, both sensory and non-sensory, derived from a number of sensory receptors, especially the retina, the ciliary muscles, the extra-ocular muscles, the semi-circular canals and otolith organs, the joints and muscles of the cervical spine and the proprioceptors of the lower limbs. Vertigo may result from loss or disorder of the afferent impulses from any of these receptors, or from disturbance of their co-ordinating mechanisms.

Aural vertigo, its differentiation from other types of vertigo, and its treatment are the subjects of this article. Aural vertigo is due to a blocked Eustachian tube, to chronic suppurative otitis media, to fistula of the external semi-circular canal and to the rare acute non-purulent labyrinthitis. Ménière's syndrome is probably due to venous congestion with œdema, like papilloedema of the eye. Aural vertigo as a rule is characterized by a sense of rotation, of the patient or his surroundings, and is associated with diminished excitability of the semicircular canals, with disturbance of the cochlear functions deafness and tinnitus, with nystagmus and with a tendency to forced movements. The head is rotated and flexed so

that the occiput is directed to the shoulder on the affected side.

Vertigo occurring from a lesion of the eighth nerve is not so severe as aural vertigo and it is usually associated with weakness in function of the adjacent seventh and fifth nerves.

Vertigo may occur as a result of vascular lesions of the pons and medulla, on account of their interference with the vestibular nuclei. Owing to the associated signs of analgesia, paræsthesia, hemiataxia and paresis it may be readily differentiated from aural vertigo. Pontine lesions in disseminated sclerosis producing vertigo are associated with a normal cochlear function, and other signs of disseminated sclerosis.

Vertigo is not a common or severe symptom of cerebellar lesions. In patients suffering from hyperpiesia momentary dizziness provoked by stooping occurs as the result of disturbance of circulation through the labyrinths.

Vertigo as a result of an intracranial tumour will be associated with symptoms of increased intracranial pressure of a progressive type.

Dizziness in patients suffering from the after effects of head-injury is not rotatory vertigo but a momentary sense of unsteadiness, which is especially liable to be brought on by stooping or sudden movements of the head. There will also be impaired concentration, irritability and nervousness.

Vertigo in epilepsy may constitute the aura of an attack. In such cases the onset is very sudden and recovery is very rapid, and there is always a loss of consciousness.

Vertigo occurs with migraine, and is due in such cases to a spasm of the branches of the internal auditory artery or the arteries supplying the vestibular centres.

Vertigo in a neurosis is generally described as a sensation of the legs giving way and is associated with other neurotic symptoms.

The best medical treatment of aural vertigo is luminal, gr. ss t.i.d. If necessary larger doses can be given subcutaneously during a severe attack. Surgical division of the eighth nerve is useful in intractable cases.

GUY H. FISK

Anæsthesia

A Warning regarding Basal Narcotics. Love, R. J. McN., *Brit. M. J.*, 1934, 1: 327.

The author condemns the widespread use of narcotics in pre-operative medication, and points out that they are not entirely free from danger. Particular reference is made to the use of morphia with the basal anæsthetics, *e.g.*, avertin. He recommends that avertin should be given only in two-thirds of the official dose, which is 100 mg. per kilo of body weight, and that its effect be supplemented by gas and oxygen if necessary. Two cases are reported in

which narcotics were undoubtedly one of the contributory causes of death.

In the first instance, a thyroidectomy, the premedication consisted of morphia, gr. $\frac{1}{4}$, and hyoscine, gr. 1/100, followed by avertin in the 100 mg. per kilo dosage. The operation was completed in 45 minutes, but the patient never recovered consciousness. There was progressive respiratory depression and death occurred 5 hours later.

The second case was a laparotomy for long-standing pelvic infection. The patient had undergone previous operations, in one of them intravenous nembutal being employed without harmful effects. This time the pre-operative medication consisted of nembutal, gr. $1\frac{1}{2}$, the night before, and nembutal, gr. 3, together with morphia, gr. 1/6, and atropine, gr. 1/150, the morning of the operation. Open ether was employed during the operation which lasted 2 hours. The patient never recovered consciousness. The pulse rate went up immediately following the operation and continued so for two days. Lumbar puncture on the second day revealed nembutal in the spinal fluid. Death followed two days after the operation. The author attributes it to the fact that the prolonged toxæmia from the pelvic suppuration made the patient unduly susceptible to nembutal and produced a typical barbituric acid toxæmia, with pulmonary congestion and bronchopneumonia.

In the discussion which appeared in the next issue of the journal following the publication of this article, Sir Francis Shipway claimed that morphia, gr. $\frac{1}{4}$, and hyoscine, gr. 1/100, would have a profound depressing effect upon the respiration, and supported the author's warning. Geoffrey Keynes and C. Langton Hewar claimed that not more than one-eighth of a grain of morphia should be given before avertin, and that in such case the danger of respiratory depression is almost non-existent. R. Blair Gould pointed out that nembutal and morphia, gr. 1/6, were used combined with open ether in the second case. Nembutal entirely masks the signs of anæsthesia, and hence it is easy to give an overdose with ether in that way. All of the correspondents agreed as to the importance of conservatism in the pre-operative medication and the employment of minimal doses of morphia when given in conjunction with avertin.

ARTHUR WILKINSON

Live happy in the Elizium of a virtuously composed Mind, and let Intellectual Contents exceed the Delights wherein mere Pleasurists place their Paradise. Bear not too slack reins upon Pleasure, nor let complexion or contagion betray thee into the Exorbitancy of Delight. Make Pleasure thy Recreation or intermissive Relaxation, not thy Diana, Life and Profession. Voluptuousness is as insatiable as Covetousness. Tranquillity is better than Jollity, and to appease pain than to invent pleasure.—Sir Thomas Browne.

Obituaries

Frederic Newton Gisborne Starr, C.B.E., M.B., M.D., C.M., F.R.G.S.

Dr. Frederic Newton Gisborne Starr, of Toronto, died on Saturday, April 21, 1934, from a paralytic stroke.

Doctor Starr graduated from Victoria College (M.D., C.M., 1889) and received his M.B. from the University of Toronto in the same year. After extended post-graduate work in England, France and Germany, he returned to Canada and took up practice in Toronto.

During his active life he was associated with the University of Toronto, the Toronto General Hospital, the Toronto Western Hospital, the Hospital for Sick Children, St. John's Hospital and the Women's College Hospital and was Councillor on the College of Physicians and Surgeons. He was, on his retirement from active teaching, appointed consulting surgeon to these hospitals, and held the rank of Emeritus Professor of Clinical Surgery in the Faculty of Medicine of the University of Toronto. He was also a member of the Board of Governors of that institution. He was a Fellow of the Royal Geographical Society.

Dr. Starr, during the war, served with distinction as a Major with the Royal Army Medical Corps, and was twice mentioned in despatches for gallantry on the field. His service was recognized when he was created in 1919 a Commander of the Order of the British Empire.

One of Dr. Starr's important contributions to medical progress in Canada was expressed through the Canadian Medical Association, of which he was General Secretary from 1893 to 1901, and a member of the Executive Council. In this organization, of which he became president in 1927, he had taken an active and stimulating interest since 1906, and had been most generous in the time and thought which he devoted to the cause of increasing the service which the medical profession might render. His energy and vision were in no small way responsible for the founding of the Royal College of Physicians and Surgeons of Canada, and he was the first surgeon to become President of that organization. The esteem in which he was held in the surgical world is evidenced by his Vice-Presidency in the American Surgical Association and the American College of Surgeons. He had for some years held the post of Vice-President of the British Medical Association.

The baptismal names, Frederic Newton Gisborne, given to Dr. Starr have a historic significance. They were the names of an uncle, an English engineer, who, when working in Canada, was the originator and manufacturer of the first submarine telegraph, that connecting Newfoundland and Cape Breton. A great-uncle, Rev. James Evans, was a missionary and chaplain to the Indians in the Hudson's Bay Territory. He invented

a written language for these people and printed the first Cree hymnal.

Dr. Starr was a member of the medical fraternity, Nu Sigma Nu, and also the honour fraternity, Alpha Omega Alpha and of the following organizations: York Club, Toronto Golf, Toronto Hunt, Royal Canadian Yacht Club, Cricket Club, Granite Club, Toronto Jockey Club, Rosedale Golf, Royal Canadian Institute, and a life-member of the Art Gallery. Fishing and shooting were his chief diversions.

He is survived by his widow and three brothers: J. R. L. Starr, K.C., D. E. Starr, both of Toronto, and G. H. Starr, of Chicago.

His funeral was very largely attended. The public service at Convocation Hall followed a private service at the residence, 112 Warren Road, attended by relatives and conducted by Rev. Dr. Trevor Davies, pastor of the Timothy Eaton Memorial Church.

The platform at Convocation Hall was banked high with floral tributes from those who honoured Dr. Starr not only as a great surgeon but as a man of broad humanity and idealism. The casket rested at the foot of the pulpit, unadorned save for a simple cross of white and green flowers. On the platform were Dr. Davies, who preached the sermon, and Dr. H. J. Cody, President of the University of Toronto, and Chancellor E. W. Wallace, of Victoria University. The Scripture lessons were read by Dr. Wallace, while Canon Cody read the memorial prayers.

The honorary pallbearers were: Sir Joseph Flavelle, Premier George S. Henry, Dr. T. C. Routley, Dr. Duncan Graham, J. A. McLeod, Dr. J. G. FitzGerald, Dr. E. W. Archibald, Montreal; Dr. James McCallum, Dr. Alex-

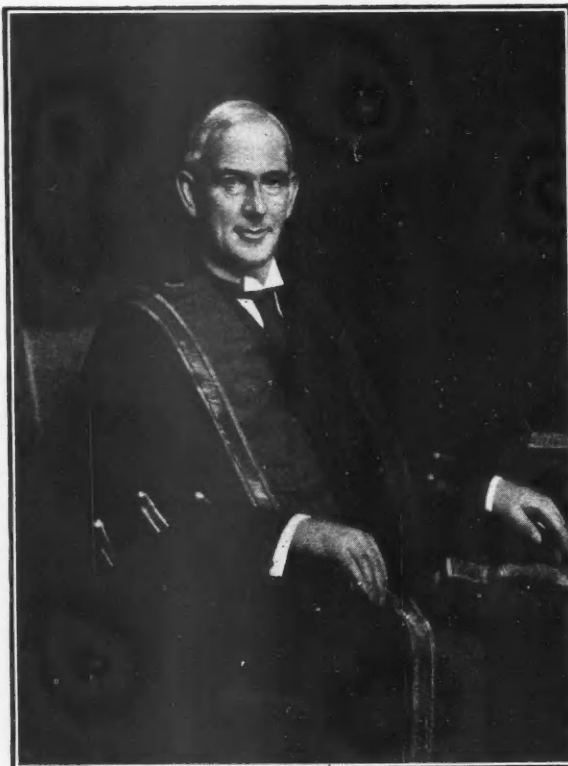
ander Primrose, Brig.-Gen. C. H. Mitchell and Colonel R. Y. Eaton; the active pallbearers, Drs. H. K. Detweiler, R. E. Robertson, John A. Oille, R. V. B. Shier, E. W. Mitchell and Roscoe Graham. The ushers were drawn from the Nu Sigma Nu Medical Fraternity, an organization with which the late Dr. Starr had been associated since its inception in Toronto.

Among the relatives attending the public service were two brothers, J. R. L. Starr, K.C., member of the Board of Police Commissioners, and Evan Starr; a third brother, George, of Chicago, was prevented by illness from attending.

Interment was in Mount Pleasant Cemetery.

AN APPRECIATION

With the passing of Dr. Starr Canada has lost one of the most outstanding figures in its surgical history. The evolution of surgical practice has now reached a development where never again will it be possible for



Frederic Newton Gisborne Starr
After a painting by Joshua Smith, R.B.A.

any one individual to be so truly a "general surgeon" as was Dr. Starr. The period in the evolution of Canadian surgery of which he was a part represents one of the most interesting phases of surgical progress. He began his active surgical career with the new technique originated by Lord Lister, which embodied the use of the Lister carbolic steam spray. He saw surgery develop until anti-sepsis was replaced by a-sepsis, until no portion of the body lay beyond the field of surgical endeavour.

In these days of economic stress and difficulty, it is heartening to know the obstacles which, by a dogged determination and a singleness of purpose, Dr. Starr was able to overcome. He was born in Thorold, Ont., on August 28, 1867, the youngest of six sons of J. Herbert Starr, of Halifax, a Methodist clergyman of United Empire Loyalist ancestry. Despite the frequent change of home environment and educational facilities which was the lot of the early Methodist pioneer preachers, Dr. Starr decided upon a college education and a career in the practice of medicine. The economic stress made it imperative that Dr. Starr supplement his income during his undergraduate days. His vision and imagination, which were among his greatest assets, served to make this possible, and as a result of the necessity he developed a business connection in the sale of tea, personally blended. Had he not forsaken this for the study of medicine, it would have placed him on just as great a pinnacle in the business world as was his niche in the world of surgery.

His post-graduate training on the continent and in England, at a time when it was not the accepted custom to study abroad, again demonstrated his vision and his determination to do work which would be second to none. The two men who most influenced his life were Alexander McPhedran, Emeritus-professor of Medicine, University of Toronto, and Sir John Bland-Sutton, of Middlesex Hospital, London.

On his return to Toronto he engaged in general work, which he combined with a steadily increasing surgical practice until 1906, when he entirely forsook the former for the latter. During this time he was a valued teacher in the Departments of Anatomy and Surgery, and his association with the late Dr. W. T. Aikins, an original and brilliant surgeon, served to stimulate and further develop his surgical prowess.

In addition to the arduous demands made on his time by his academic responsibilities, his general and surgical practice, he was elected General Secretary of the Canadian Medical Association in 1893, took office in 1894, and held this post until 1901. For a continuous period of forty-one years Dr. Starr was an officer and an ardent worker in the Canadian Medical Association, culminating in his appointment to the presidency in 1927. Only two weeks prior to his passing, he spent two days in Montreal at a meeting of Council. The continued existence of the Canadian Medical Association is due more to Dr. Starr's early efforts than to any other factor. At a time from 1894 to 1901 the difficulties of maintaining and keeping alive our national organization over such a wide territory were largely overcome by his untiring efforts. The Royal College of Physicians and Surgeons of Canada probably owes its existence more to Dr. Starr's vision and individual effort than to any other single factor. The cheerfulness with which he gave time and effort to the cause of organized medicine and the betterment of medical practice in Canada will probably stand as one of his greatest contributions as a Canadian.

As a Chief, Dr. Starr had an uncanny gift of picking out the weak and strong spots in his associates and immediate assistants. His ability to develop men and to make them confidently assume real responsibility was one of his greatest qualities as a teacher. One had to associate with Dr. Starr more intimately than was possible in a ward clinic or theatre lecture to appreciate his greatness as a clinical surgeon and teacher. His ability to see through a mass of irrelevant clinical detail and recognize the salient and

crucial facts in a clinical problem was nothing short of amazing. His private histories were remarkable for their terseness and wealth of essential information, utterly devoid of irrelevant data.

His sense of humour came to his assistance at all times. When faced with desperate situations in the operating theatre, a pointed story, told with the soft voice and quiet little chuckle so familiar to us all, would ease the whole tension of the situation, and he thus had, without any boisterous display or imperiousness, the best that all associated with him could give. He never ruled by fear. His ability to impart his equanimity and poise gave to his associates one of his richest blessings. As a craftsman he was without a peer, and in the days when he devoted his energies exclusively to surgery, it is doubtful if anyone was more capable than he in all the phases of technical surgical problems. His constant reading made him conversant with the current developments in surgical practice. No assistant or associate was ever discouraged, should he suggest a procedure or a research problem which to many might have seemed fantastic. His rational assessment of the newer procedures and developments in surgery was based on a large and studiously acquired experience. His judgment was always sound; his criticisms were constructive, and never destructive. His insistence that all surgeons should be capable of making their own diagnoses and defending them did a great deal to make his students surgeons instead of mere operators.

We who worked closely with him and saw him in a more intimate way knew a Dr. Starr which the world did not know. The unexpected kindness and thoughtfulness and loyalty which he was constantly showing to his friends were always delightful surprises. His kindness to his patients and the confidence and peace which he inspired in those critically ill were really remarkable. As many of his patients have said—"If I do not recover, I know nothing more could be done". To be able to give such comfort to one's patients because of their implicit confidence brings to a surgeon a rich reward, which Dr. Starr enjoyed to the full.

Dr. Starr was one of the men who never seemed to grow old to his associates. His ordered life, his punctiliousness and ability to deal efficiently and methodically with a great mass of detail, made one regard him always as a mentally young, efficient individual. He was rarely, if ever, late for an appointment. His quiet way earned for him a very warm affection with the members of the undergraduate body who were privileged to know him. To see him at an open meeting in his own medical fraternity was to see a Dr. Starr whom those who knew him only as a successful surgeon would never recognize.

In 1904 he married Anne Callander, daughter of George Forrest Mackay, Hillhead, New Glasgow, N.S. The home life which Dr. Starr was privileged to enjoy explains in a large measure the wonderful placidity and philosophy which enabled him to live a full and crowded life with such apparent ease.

He was the recipient of honours without stint, and at the close of his career had accorded him the highest surgical honours that this continent could bestow. His military service was recognized by the conferring of the Order of the British Empire, Military Division. At the time of his passing he was a member of the Board of Governors of the University of Toronto, and this outlet for his energy and ability was gradually replacing his interest in active operative surgery.

We had hoped, as one of his medical confrères expressed it, that, "restful and content, he would have been able for long to keep in contact with and watch what he had helped to create—but! that would not have been Fred Starr." His example of industry, punctiliousness, dogged determination and singleness of purpose, which enabled him to overcome many and difficult obstacles, physical and economic, and reach the highest realm of surgical endeavour will, I am sure, long serve as a heartening stimulus to the undergraduate with surgical ambitions. ROSCOE R. GRAHAM

Dr. H. L. Abramson. The report of the death, recently, of Dr. H. L. Abramson, of Saint John, N.B., was received by his friends throughout eastern Canada with a sense of shock at the suddenness of his departure and a further sense of the extreme loss suffered by us all in the death of our esteemed colleague. Dr. Abramson was for fifteen years Provincial Pathologist, Bacteriologist, and Director of the New Brunswick Bureau of Laboratories. He had been in poor health since last fall and had recently been on extended sick leave, which he spent in the southern United States. He was 48 years of age.

Dr. Abramson was born in St. Joseph's, Missouri. His medical education was received at Yale University, from which school he graduated in 1911. Later, he served an internship in the Pathological Department of the Rhode Island Hospital and in the contagious diseases hospital in the same city. His next internship was in the New Haven Hospital in Connecticut, where he became associated with Dr. Wm. H. Park as Assistant Director of the research laboratory of the New York City Department of Health. At the same time he was an Instructor in Bacteriology in Bellevue Medical College. While engaged in this work in New York, an epidemic of infantile paralysis was sweeping that city. Dr. Abramson did some original research work on this disease. His contributions to the literature in this connection were so outstanding as to become almost a classic. Dr. Abramson at this time, also, did a considerable amount of work on epidemic spinal meningitis.

Any description of the position filled by Dr. Abramson in the medical community in Saint John would fall far short of describing his many activities. Besides those above mentioned he was an outstanding medico-legal authority in the Maritimes and his association with City, Provincial and Royal Canadian Mounted Police had extended over many years. He was an active consultant in all public health matters and in his hospital contacts was the most generally consulted of any physician in the community. Dr. Abramson had the desire and the ability to constantly take up new work as it was presented in the literature, and he was possessed of an uncanny ability to pick out what was useful as it appeared. His industry would immediately make this knowledge or new technique available to the hospitals which he served. Examples of his acumen in seizing on new methods could be multiplied, but his immediate interest in the recent advances in diabetes, in the work on anæmias, and in immunization against diphtheria and scarlet fever is fresh in the memory of all of us.

In the social life of the community Dr. Abramson always played an outstanding part. He was a Mason, a Kiwanian, an ardent and skilful golfer, an earnest fisherman, and for years had been the mainstay and for two years the president of the Family Welfare Association in Saint John City. Dr. Abramson was an extremely well informed physician. In debate he was dogmatic when his opinions had crystallized. He helped everybody who sought his help, and perhaps did more than any other man in New Brunswick in the last fifteen years to better the practice of medicine in his locality. He was a keen supporter of the Saint John Medical Society, the New Brunswick Medical Society, frequently appearing as a speaker at their meetings.

He has left as friends all who knew him. It will be an almost impossible thing for any one man to fill his place. He is survived by his wife in Saint John and several brothers in the United States, to whom our sympathy is earnestly extended. A. STANLEY KIRKLAND

The medical profession of Canada, especially that of New Brunswick and the City of Saint John, in the passing of Dr. Abramson has lost a colleague of sterling worth. It has been the privilege of but few medical men anywhere to contribute more, pertaining to their individual specialties, comparative to the ex-

tent of the constituency he served, than had Dr. Abramson to the Province of New Brunswick. He came to this province about the time of the inauguration of the new Department of Health, and being the promoter of this organization, I had a good opportunity of weighing carefully the valued contribution he made at that time toward its completion. For eight years, 1917 to 1925, the period during which I was officially connected with the Department of Health of New Brunswick, he proved himself to be a most attentive, energetic Chief of the Bureau of Laboratories of our Department. He was ever willing to impart information along the lines of his specialties to his colleagues, when such was required of him, and in a manner free from ostentation and most pleasing to those seeking such knowledge. In his relationship to the Saint John General Hospital and throughout the province, he will be greatly missed and his post will be most difficult to fill.

W. F. ROBERTS

Dr. George Church Anderson, of Montreal, died at his residence on April 17, 1934, after a year's illness. He was 42 years of age, and came from Central Square, N.Y., to attend McGill University. He took up practice in Montreal following his graduation in 1915. He was a Demonstrator in Anatomy and Histology at McGill. In 1918 he married Blanche Crandall, of Saint John, N.B., and had two children, George and Joan, who with his mother, survive him.

Dr. Billa Flint Butler, of London, Ont., died on March 1, 1934, in his eighty-third year. He was a graduate of McGill University (M.D., C.M., 1879). Dr. Butler located in London forty-three years ago, and for many years had his office at the corner of Waterloo Street and Queen's Avenue. He retired twenty-six years ago. From 1897 to 1903 he lectured on rhinology, ophthalmology, otology and laryngology at Western University. Surviving are his wife; four daughters, Mrs. G. Tambling, London; Mrs. O. Camozzi, California; Mrs. H. S. Henderson, South Dakota; Mrs. G. C. Paterson, Collingwood; and one son, W. E., of Manitoba.

Dr. Margaret Cowan Calder, of Wingham, Ont., died on or about April 11, 1934. She was a prominent medical practitioner at Wingham for the past twenty-five years. Born in the township of Grey, near Cranbrook, a daughter of the late Thomas and Ann Calder, Dr. Calder received her public school education there. Her collegiate training was received at Seaforth. For a short time she taught school, prior to entering Toronto University, from where she graduated in 1908.

Dr. Charles Manley Foster, of Toronto, died on April 9, 1934, at his residence. He was in his seventy-fifth year. Dr. Foster was a graduate of Victoria University in 1884. He is survived by a sister, Mrs. Emily M. Corlett, and a nephew, C. R. Corlett.

Dr. John Fleming Goodchild, of Toronto, died on April 27, 1934. He was a graduate of Queen's University in 1899. He also was L.R.C.P.(Lond.) and M.R.C.S.(Eng.), and held the B.Sc. in Public Health (Edin.). He is survived by his widow, Emma Welch Goodchild and two children, Dr. Sandford Goodchild and Miss Margaret Goodchild.

Dr. Thomas John Gowan, of Horning's Mills, Ont., died on April 28, 1934, in his 76th year. He was a graduate of Western University (1892).

Dr. Duncan McEdwards, of Hamilton, Ont., died on April 26, 1934, in his 74th year. He was a graduate of Trinity Medical School (1886).

Dr. Arthur Stevenson McElroy, of Ottawa, died on April 20, 1934, from a paralytic stroke. He had practised in Ottawa for thirty-six years.

Dr. McElroy was a son of the late Henry McElroy and his wife, Margaret Lindsay, and was born in September, 1869, at Richmond, Ont. He was educated at Richmond, and attended the Ottawa Collegiate Institute.

Intending to enter pharmacy, Dr. McElroy first became associated with H. F. McCarthy, druggist, and graduated in pharmacy. Later he entered McGill University, and in 1897 graduated from the medical faculty there. For about a year Dr. McElroy was on the house staff of the Royal Victoria Hospital, Montreal, but in 1898 he returned to Ottawa and established practice in the Glebe district, where he was among the earliest resident physicians.

Early associated with the old Protestant General Hospital, on Rideau Street, he was one of the original consulting physicians to the Ottawa Civic Hospital on its creation, and had the confidence and esteem of the medical profession here as well as of the public.

His success in his chosen work was indicated by his membership on the Provincial Board of Health, and he was also honoured by his fellow doctors in Ottawa by election to the presidency of the Ottawa Medical Chirurgical Society. As chairman of the joint advisory board of the Ottawa Civic Hospital he was closely associated with the management of that great institution. His general professional standing and personal integrity was recognized when he was appointed a Justice of the Peace some years ago.

Although one of the most consulted physicians in the city, Dr. McElroy found time for numerous outside interests. He was a member of Glebe Presbyterian Church, and continued with the congregation after it joined the United Church of Canada. He was a past master of the Masonic Order, being a member of the Lodge of Fidelity, A.F. and A.M., and was actively associated some years ago with the Glebe Lawn Bowling Association. A keen golfer, he was one of the best known members of the Rivermead Golf Club.

Dr. McElroy was an enthusiastic sportsman and was for some time a member of the Jovial Fish and Game Club, as well as of the White Fish Lake Game Club.

His experience in dealing with all types of people was well recognized in business and commercial circles, and he had been for a considerable time medical examiner for the Mutual Life Assurance Company, as well as an official of the Ottawa Electric Railway Company.

His wife, formerly Miss Lillian Rorke, predeceased him some years ago, but three daughters, Mrs. Neil Delahay, Mrs. D. Ellis and Miss Elsie McElroy, all of Ottawa, survive. Also, he is survived by a brother, John McElroy, and a sister, Miss Annie McElroy, both of Ottawa.

Dr. Donald McLeod, of Toronto, died at his home on April 19, 1934, after an illness of four days. Dr. McLeod was born near Woodville, Ont. After graduating from Trinity Medical College in 1889, he took post-graduate work in New York, and began practice at Duntroon. He later moved to Stayner, where he remained for twenty-five years. He had been practising in Toronto for the last twenty-five years. He is survived by two daughters, Mrs. H. Wilson, of Toronto, and Ruth, at home; two sons, Norman, of Toronto, and Dr. Kenneth, of New York; three sisters, Mrs. D. L. Anderson, of Cannington, Mrs. F. Fisher and Miss Dorcas, of Toronto; three brothers, Norman, Alex. and John, all of Woodville. His wife passed away three years ago.

Dr. James Milton Montgomery, of Smiths Falls, Ont., died on April 4, 1934. Dr. Montgomery was in his thirty-third year, and was born in Smiths Falls, receiving his education in local schools and graduating from Queen's University in 1924, after establishing a splendid record. For some time he occupied a position in Utica State Hospital, later practising in Yarker and Powassan.

About five years ago he returned to the district of Smiths Falls, and opened practice in Jasper, where he continued until recently, when he moved to Smiths Falls, making his home with his parents there.

Dr. Suther Corbet Murray, aged 88, one of the oldest members of the medical profession in New Brunswick, died in the Moncton City Hospital on April 28, 1934, following a paralytic stroke which occurred about three weeks before.

Dr. Murray was born at Economy, N.S., but spent the greater part of his life in New Brunswick, where he practised in Albert for upwards of sixty years. His earlier education was received at Dalhousie University, where he received his Arts degree. He graduated in medicine from Harvard University in 1871.

Dr. Murray endeared himself to a large community by many years' faithful and untiring service. He was a strong supporter of the New Brunswick Medical Society, and for long served as a member of the College of Physicians and Surgeons of New Brunswick.

A. STANLEY KIRKLAND

Dr. Richard Peter Pattee, of Hawkesbury, Ont., died on April 3, 1934, at his home, aged 83 years. He was a graduate of McGill University (1874). He is survived by his widow, Sarah Johnson.

Dr. Alfred Napoleon Rivet, of Montreal, formerly a professor of the University of Montreal, died on April 21, 1934, at the Hôtel-Dieu after a two months' illness. He was in his 69th year.

Dr. Rivet was born in Montreal in 1865. He studied at St. Mary's College and took his medical training at Victoria University, afterwards doing special work at the Pasteur Institute in Paris. Returning from Paris with a special interest in chemistry, he worked towards the establishment of laboratories in this subject. At first professor of anatomy, he later held the chair of toxicology, which he occupied until 1916. In that year he went overseas with the General Hospital, Laval No. 6, as major. He has also served on the Board of Medical Examiners of Canada.

Dr. Rivet was well known in St. Jean Baptiste ward where he practised medicine for some 25 years. He is survived by his wife, formerly Delvina Gervais, and five daughters, Jeanne Rivet, Mrs. T. N. Beaulieu, Gabrielle Rivet, Mrs. Anatole Desy, and Marcelle Rivet.

Dr. Joseph Rymal Smith, of Grimsby, Ont., died at the Hamilton General Hospital on April 1, 1934. He was born in 1866, and was a graduate of Victoria University (1892). He is survived by his widow, Florence Louise Henry.

Dr. John James Walker, of Montreal, died on May 4, 1934, at the Royal Victoria Hospital there, in his sixty-first year. Dr. Walker was born at Ormstown, Que., and graduated from McGill University in Arts (1902) and in Medicine (1906). He was appointed Associate in Medicine at the Royal Victoria Hospital in 1922, and Demonstrator in Medicine at McGill in 1924. He was interested specially in metabolism. Dr. Walker also was Health Officer for Ste. Anne de Bellevue in 1913-14. He is survived by his widow, formerly Miss Beatrice Helen Lidstone.

News Items

Great Britain

Post-graduate Courses at Edinburgh.—The syllabus for the post-graduate courses at Edinburgh, in connection with the University and the Royal Colleges, has just been received. Some of the courses are given during the spring and autumn terms, but the following will be given during the summer, that is, roughly, from the middle of July to the middle of August: Obstetrics and Gynaecology; Child Life and Health; a General Practitioners' Course; a General Surgical Course; The Interpretation and Significance of Modern Diagnostic Methods; Diseases of the Blood; Endocrinology; Diseases of the Nervous System; Urology; X-ray Physics and Electrotechnics; Ultra-Violet Radiation; Ophthalmoscopy; Urological Surgery; Treatment of Fractures and Orthopaedics; Neurological Surgery. The fees range from one to ten guineas, according to the course selected.

Applications for enrolment should be made to the Secretary, Dr. James K. Slayter, Secretary, Post-graduate Courses in Medicine, University New Buildings, Edinburgh. Places will be reserved only if applications are accompanied by the fees. Entries should be sent in at least two weeks before the course starts. If a graduate, after paying the fee, is unable to attend, the fee will be returned in full, provided that the notice of withdrawal is sent to the Secretary at least one week before the commencement of the course. Women graduates are eligible to enter the courses.

In the Houses of University Hall—
Ramsay Lodge, 3-6 Ramsay Garden;
St. Giles House, 22 St. Giles Street;
Blackie House, 8 North Bank Street;

there is suitable accommodation for gentlemen attending the summer courses in Edinburgh. The Houses are all within five minutes' walk of the University. The rooms are fitted as study bedrooms, and there are large dining rooms and common rooms in addition, good bathroom accommodation, with an abundance of hot water, electric light, etc. The inclusive charge for board and lodging is £2. 15s. per week. Apply to Messrs. Whitson and Methuen, C.A., 21 Rutland Street, Edinburgh.

Cowan House, George Square, is also open during the month of July. Particulars may be obtained from the Warden.

Graduates may also obtain a list of vacant apartments on application to the Secretary.

Women graduates should apply to Miss Marjorie Rackstraw, B.A., General Adviser of Women Students, University Old College.

Sir Henry Wellcome.—The President of the French Republic has paid a notable tribute to English scientific research by conferring the honour of Chevalier de la Légion d'Honneur upon Sir Henry Wellcome, LL.D., F.R.S., the Founder of the Wellcome Research Institution and its associated research laboratories and museums, in which are included the Bureau of Scientific Research, Physiological, Chemical and Entomological Research Laboratories, and the Museum of Medical Science and the Historical Medical Museum. These research laboratories and museums, associated together in the Wellcome Research Institution, whose magnificent new building in the Euston Road, London, occupies a site having a frontage of 360 feet, have by their original medical, chemical, physiological and historical researches contributed largely to international scientific knowledge, a fact which finds recognition in the honour bestowed upon the Founder by the Government of France.

Alberta

Dr. Heber Jamieson, of Edmonton, is gathering data on the early history of the practice of medicine in Alberta and has a good collection of pictures of the early physicians, hospitals, nursing homes, etc., together with a fund of other information. He is desirous that members of our profession should advise him of items of historic interest of which they have knowledge before the facts are lost forever. He would like physicians who have formerly lived in the province to assist as far as possible. The Council made a small grant in April towards the expenses involved. G. E. LEARMONTH

British Columbia

The Medical Act of British Columbia has been amended to enable the Council to deal with practitioners who are delinquent in their dues to the College of Physicians and Surgeons. Under the new amendment a member who fails to pay his dues after sixty days from the date of receiving notice by registered mail can be suspended from practising.

The annual meeting of the Vancouver Medical Association was held on April 24th. Outstanding features of the year were the recognition by the relief authorities that medical services should be paid for, and a comfortable surplus from the operation of the monthly bulletin of the Association. Dr. Anson C. Frost was elected President for the coming year. C. H. BASTIN

New Brunswick

At a recent cabinet meeting of the New Brunswick Legislature, Dr. C. G. Main, of West Saint John, was appointed coroner for the Municipality of Saint John.

At the regular monthly meeting of the Saint John Medical Society held at the end of March in the Admiral Beatty Hotel, further discussions took place as to ways and means of collecting at least part-payment for services rendered by physicians to persons on relief. Dr. A. S. Kirkland, Roentgenologist at the Saint John General Hospital, read a paper on the subject of "Opacities in x-ray work". The paper was discussed by Dr. W. E. Rowley and Dr. E. A. Petrie.

Dr. R. A. Hughes has been confined to the General Hospital in Saint John for some weeks with a severe attack of rheumatism. His recovery has been slow, but latest reports indicate that improvement is progressive. A. STANLEY KIRKLAND

Nova Scotia

The Halifax Branch of the Nova Scotia Medical Society in a comprehensive report to the mayor of the city made several suggestions for the improvement of public health of which the following are of special interest:—

That daily inspection be made of pasteurization plants; that a certain slaughter house be closed down; that more medical men be included in the Board of Health; and that more attention be paid to preventive medicine, such as immunization against diphtheria and vaccination against small-pox. The report points out that great improvement can be made in the milk supply.

From Boston comes the report of the death of Dr. Colin MacDonald, for many years a prominent figure of the Massachusetts Medical Society. He was a graduate of St. Francis Xavier College and later attended a medical course at Dalhousie University, and then proceeded to New York where he received his medical degree from the College of Physicians and Surgeons.

Dr. S. H. Keshen, of Halifax, has been elected president of the Canadian Amateur Basketball Association. Dr. Keshen has been prominently associated with basketball for many years and the honour is highly deserved.

An item of particular interest to curlers and to the medical profession generally was the wind-up of the season of the Halifax Curling Club at the end of March. A bonspiel to collect funds for the local Children's Hospital was held. Rinks from several centres participated and play took place on two days. Not only were the games run on the double knock-out system, much enjoyed, but the sum of \$352 was raised. Some of the most enthusiastic taking part were medical men.

N. B. DREYER

Ontario

The Mount Sinai Hospital, Toronto, is undertaking a building campaign to extend its capacity to 85 beds. With this proposed extension the hospital will rank among the finest hospitals on the continent for its size.

The Brant Sanatorium at Brantford is contemplating the erection of a 20 bed infirmary, with other improvements, at an expenditure of \$80,000.

It is announced that Dr. R. K. Paterson, of Ottawa, is to be the Director of the new Cancer Clinic at the Ottawa Civic Hospital.

On April 25th the General Hospital at Parry Sound was damaged by fire to the extent of \$25,000. Ten nurses, only five of whom were on duty, are credited with averting a panic among the patients, all of whom were safely removed from the burning building.

The American Clinical and Climatological Association held its fifty-first annual meeting at the Royal York Hotel, Toronto, on May 21st to 23rd, under the presidency of Dr. C. D. Parfitt, of Gravenhurst.

Among the newly elected members of the American College of Physicians are Dr. G. K. Wharton, of London, and Dr. J. H. Holbrook, of Hamilton.

At a meeting of the Huron County Medical Society, held in Goderich on April 25th, the question of medical relief was thoroughly discussed. It was felt by those present that the care of indigent and near-indigent patients is an increasing burden on the medical profession and many municipalities are doing little or nothing towards sharing this burden. J. H. ELLIOTT

Quebec

A striking honour was paid a leading Montreal physician and educationist when Dr. Jonathan C. Meakins, Director of the Medical Department of McGill University and Physician-in-chief at the Royal Victoria Hospital, assumed office as president of the American College of Physicians. Named president-elect at the College convention held in Montreal a year ago, Dr. Meakins formally took over his new post on April 19th, at this year's meeting, which was held in Chicago.

Dr. Meakins is the second Canadian to hold this post, Dr. Charles F. Martin, Dean of the Faculty of Medicine at McGill, having been President in 1928-29.

Announcement is made by the Bruchesi Institute in Montreal of the acquisition of St. Paul's Hospital, to be used as a sanitarium. The new institution will furnish 134 beds for the treatment of children suffering from tuberculosis in Montreal, and will be under the financial administration of the Notre Dame Hospital. Patients now under care in St. Paul's Hospital will be moved to the new hospital being erected on Sherbrooke

Street, East, by the St. Luke Hospital for the treatment of contagious maladies.

Honouring services rendered to the Montreal Children's Hospital by its founder, Dr. Albert E. Vipond, a tablet was unveiled on December 21, 1933, in the hospital building on St. Antoine Street. Dr. Vipond attended in person to receive the tribute paid to him by the board of governors, hospital staff and friends of the institution.

Dr. H. P. Wright, chief of the medical services, and Dr. Vipond's successor, in his address to the gathering, stated that Dr. Vipond founded the hospital in 1920, having for many years previously administered aid to the sick poor children of Montreal. Dr. Vipond was a pioneer in infant feeding and was successful in his treatment of children's diseases by this method. Dr. Wright added, "I have always been impressed by Dr. Vipond's originality, enthusiasm and devotion to his work. He is a physician in name and deed, and for many years has enjoyed an extensive clientèle. It is our hope that he will be spared for a long time to give his patients the benefit of his experience and advice."

The tablet was then unveiled by Dr. Wright. Dr. Vipond, in whose honour the tablet was erected, thanked the board of governors, the staff and friends for their kindness. He paid tribute to the administrative work of William Northey, president of the hospital, to those who had assisted him from the start in building up and maintaining the institution, and to Dr. Wright, who succeeded him as chief specialist.

United States

The Gynecean Hospital Institute of Gynecologic Research of the University of Pennsylvania is conducting an intensive study of families into which congenitally malformed individuals have been born. Special interest centres in families in which malformations have appeared in two or more children. Physicians who have knowledge of any such families are urged to communicate with Dr. Douglas P. Murphy, Gynecean Hospital Institute, University of Pennsylvania, Philadelphia, Pa.

General

The Canadian Public Health Association and the Canadian Tuberculosis Association will meet in Montreal on June 11th, 12th and 13th. In addition to set papers there will be clinical sessions and demonstrations. An excellent program is assured.

The Canadian Tuberculosis Association announces that it has allotted two cash prizes of two hundred and fifty-dollars each for the best papers on the clinical and laboratory aspects of tuberculosis. These prizes will be available in 1935.

A Medical Study Trip to Hungary.—At the invitation of the Hungarian Medical Postgraduate Committee of Budapest, Professor Emil de Grosz, President, and of the Association "Budapest, Town of Medicinal Springs", Archduke Dr. Francis Joseph, President, a medical study trip to Hungary is being organized. The plans provide for a fortnight visit to Hungary, during which there will be post-graduate lectures and demonstrations in English at the principal university clinics and at the municipal thermal baths and springs. Reduced railroad fares and hotel rates are granted by the Hungarian Government. The party will sail from New York on August 18, 1934, visiting Munich and Oberammergau en route. The return trip may be made, optionally, via Berlin, Paris, or Italy, arriving back in New York on September 30th.

Physicians of good standing are invited to join. The American Committee of the study trip consists of

Harlow Brooks, M.D., Chairman, Charles G. Kerley, M.D., Jerome M. Lynch, M.D., Wendell C. Phillips, M.D., and Erwin Torok, M.D. Richard Kovacs, M.D., 1100 Park Avenue, New York, is Secretary.

The Elliott Medal was awarded posthumously by the National Academy of Sciences, in Washington, on April 24th, to the late Dr. Davidson Black, a native of Toronto, for his study of skulls of prehistoric men found in China. Dr. Black, formerly of Peiping Union Medical College of China and discoverer of the Peiping man, died early this year. The medal carries an award of \$200.

The 27th Annual Meeting of the American and Canadian Section of the International Association of Medical Museums was held at Toronto, on March 27, 1934, and the usual Exhibit consisting of material illustrating the programs of the American Association of Pathologists and Bacteriologists and other Societies meeting conjointly was held under the auspices of the Museum Association at the Banting Institute from March 27th to 30th.

The following Officers of this Section were elected for the ensuing year: *President*, Dr. William Boyd, Winnipeg; *Vice-president*, Dr. Virgil H. Cornell, Washington, D.C.; *Secretary-Treasurer*, Dr. Maude E. Abbott, Montreal; *Council*, G. R. Callender, Texas; Victor C. Jacobsen, Albany; Tracy Mallory, Boston; James Ewing, New York; Stuart Graves, Tuscaloosa; Oskar Klotz, Toronto; F. B. Mallory, Boston; R. A. Moore, New York; H. E. Robertson, Rochester, Minn.; and Carl V. Weller, Ann Arbor.

Prof. Ludwig Pick, of Berlin, was made an honorary member.

that have prevailed about certain diseases but we learn how, as time passed, speculations became certainties, how mythology became pathology, and how empiric became rational therapeutics. The book is, despite its small size, a mine of information of this kind, always conveyed in an effective way, and will be of great value not only to those for whom it was primarily intended but also, very specially, to those, who are investigating or writing about any of the conditions dealt with and desire to get a comprehensive view of the development of their subject. One takes it up with pleasurable anticipation, reads it with rapt attention, and will hardly lay it down until it is finished. The claim that the book is an "original" venture is well founded. Among the many works on the history of medicine that have been published or are being published we know of none quite like this. By all means get it.

Surgery of the Sympathetic Nervous System. George E. Gask, C.M.G., D.S.O., F.R.C.S., Professor of Surgery, and J. Paterson Ross, M.S., F.R.C.S., Reader in Surgery, University of London. 163 pages. Price \$5.30. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1934.

This excellent monograph appears at a most opportune time. The great surgical interest in the sympathetic nervous system which followed the publications of Hunter and Royle in 1924 has resulted in the accumulation of much physiological information and the demonstration that in certain fields, notably that of vascular disease, appropriate operations upon the sympathetic nerves can be relied upon to alleviate the patient. The time is ripe for an authoritative and comprehensive survey of the present state of our knowledge in the field of surgery. Gask and Ross have most happily filled this gap with the publication of the monograph under review.

Commencing with a concise but succinct review of the anatomy and physiology of the sympathetic nervous system, the authors proceed to discuss the application of sympathectomy to (1) disorders of the circulation, (2) disorders of the visceral motor mechanism and (3) the relief of pain. In the section on circulatory disorders there is an excellent discussion upon the selection of cases suitable for operation. The use of Sir Thomas Lewis' hot-air chamber as a means of producing vasodilatation by the release of vasospasm seems excellent and new in the clinical field. The various types of operation upon the sympathetic nerve trunk and ganglion are adequately discussed and illustrated. They rightly stress the shortcomings of Royle's operation of ramisection and advocate ganglionectomy in its place. This accords with the experience of most surgeons familiar with sympathetic surgery. In the section on disorders of the visceral motor mechanism, the discussion of the complex part which the sympathetic plays in controlling the movements of gastrointestinal and genito-urinary tracts is excellent. Due consideration is given the work of Leriche. Periarterial sympathectomy is reviewed. The results which follow this operation are sometimes so excellent that the procedure should not be entirely abandoned even though the present state of our knowledge does not permit us to understand how they can occur. The section on the relief of pain considers the value of sympathectomy for certain types of dysmenorrhoea, for vesical pain, for renal pain, for angina pectoris, and for causalgia. They have strengthened their argument throughout by illustrative cases from their own experience. The literature has been extensively reviewed; every important publication of recent years is included.

Two features should be pointed out in the hope that they may be corrected in later editions. First, in discussing the technique of the operation for removal of the stellate ganglion by the posterior approach, no credit is given to Henry for his painstaking anatomical studies which made this approach possible. Adson's

Book Reviews

A Short History of some Common Diseases. By Divers Authors. Edited by W. R. Bett, M.R.C.S.Eng., L.R.C.P.Lond., Late Resident Medical Officer, Princess Elizabeth of York Hospital for Children, etc. 211 pp. Price, \$3.50. Oxford University Press, London; McAllinsh & Co., Toronto, 1934.

This excellent work is described in the preface as an original venture in medical literature, intended mainly for students and practitioners of medicine, and possibly also for patients. It is edited by Mr. W. R. Bett who sends our *Journal* not infrequently items related to the history of medicine, a subject in which he is much interested. The term "Divers Authors" masks some exceedingly well-known names in contemporary British Medicine. Sixteen topics are dealt with, which we mention, to indicate in some degree the scope of the book: Acute Infectious Diseases, by Sir John Broadbent, Bt.; Tuberculosis, by Prof. John Fraser; Venereal Diseases, by Sir D'Arcy Power; Pneumonia, by E. M. Brockbank; Rheumatism, by F. John Poynton; Rickets, by Leonard Findlay; Endocrine Disorders, by Sir Humphry Rolleston, Bt.; Bright's Disease, by Prof. J. A. Nixon; Heart Disease, by Robert O. Moon; Epilepsy, by James Collier; Arthritis, by John D. Comrie; Gall-stones, by Prof. D. P. D. Wilkie; Tonsils and Adenoids, by Lionel Colledge; Appendicitis, by W. R. Bett; Malignant Disease, by Harold Burrows; Malingering, by Sir John Collie. These names are a sufficient earnest that the work has been well done. In each case we have a connected historical review of the subject, often beginning with its head waters in Hippocratic times, but always tracing the evolution of the central idea to the present day. We learn that the ancients are not to be despised; indeed, they often anticipated our best things. Not only do we learn of the varied concepts



MODERN GLUCOSE THERAPY

with

GLUCOSE-D

In presenting Glucose-D to the members of the Canadian Medical profession, we feel that there is a definite place for it in modern glucose therapy. Clinical experience abroad has shown that, for example, while glucose is indispensable in the treatment of acidosis, it is not sufficient in itself. Where treatment must be continued for more than a day or two, the fat-soluble vitamins, vitamin D in particular, should be added to the diet. Glucose-D supplies not only pure medicinal glucose (98 per cent) but a sufficient amount of vitamin D and calcium and phosphorus to maintain a normal metabolism of these elements.

Glucose-D is indicated in cases of malnutrition, anorexia, debility and overstrain, cardiac disease, and as a preventive of travel sickness and as a dietary measure in febrile illnesses—conditions that are commonly subjected to glucose therapy. Owing to its rapid absorption and conversion into glycogen, Glucose-D may be used effectively in the prevention and treatment of surgical shock.

Glucose-D is available in original 20 oz. tins—sample tins and descriptive literature gladly mailed on request.

GLUCOSE-D WILL BE DISPLAYED AT THE FORTHCOMING MEETING OF THE CANADIAN MEDICAL ASSOCIATION AT CALGARY, WEEK OF JUNE 18TH.

AYERST, McKENNA & HARRISON, LIMITED

Pharmaceutical and Biological Chemists

MONTREAL

TORONTO

procedure is but a slight modification of Henry's operation, a modification which transforms it into a pure muscle-splitting and avascular operation, thereby removing the objections mentioned by Gask and Ross. The authors prefer the trans-abdominal approach for the lumbar sympathetic and an anterior approach according to their own technique for the cervical sympathetic.

This is a monograph which all surgeons and physicians interested in the surgery and clinical physiology of the sympathetic nervous system will read with pleasure and instruction.

Lessons on the Surgical Diseases of Childhood. William Rankin, M.B., Ch.B. 190 pages; illustrated. Price 21/- Alex MacDougall, 70 Mitchell St., Glasgow, 1934.

In this book the author emphasizes the clinical features of surgical diseases seen in children, illustrating these profusely with photographs, and touching lightly on the developmental, anatomical and pathological aspects. The descriptions of these conditions are short, which may be an advantage or a disadvantage, according to the reader's viewpoint. If we read the author's introduction we will see that he has adapted his style to his purpose, this resulting in a readable, worth-while book.

While it may be wise to be definite with students to avoid confusion, the inclusion of alternative methods of treatment would increase the value of certain chapters. In discussing empyema, for example, the author describes only rib-resection, merely mentioning that in streptococcal infection operation should be deferred. No mention is made of repeated aspiration or closed catheter drainage. It is true that these methods may require more attention and greater nursing facilities, but students should be familiar with them, because they sometimes result in lessened mortality, even if, from force of circumstances, they may not be suitable for certain hospitals, as the author intimates. In the chapter on hare-lip he states that "the stitching of a lip across a projecting alveolus in the hope that gentle pressure will restore normal outline is optimism—usually based on inexperience". Another school, however, has demonstrated that by adequate undercutting of both cheeks it is usually possible to get primary closure of the lip in these cases; that lip pressure alone approximates the alveolar edge, making wiring operations and forceful replacement unnecessary; that removal of a wedge of the septum is rarely required as a primary procedure; and that the premaxilla should never be removed because of the hideous deformity resulting later.

This book can be read with pleasure and profit, as summarizing the Glasgow teaching, with which after all we can find little fault. The author states his position frankly and stresses simple procedures. We appreciate the clearness of his presentation and the fact that he does not go into too great detail, nor repeat at length what may be found in general surgical text-books; he adheres firmly to a discussion of the special features of the surgical diseases seen in children.

The Nature and Treatment of Amentia. L. Pierce Clark, M.D., Chief of Advisory Board of Research, Letchworth Village for Feeble-minded. 306 pages. Price \$3.75. Baillière, Tindall and Cox, London; Macmillan Co., Toronto, 1933.

The author, whose untimely death has occurred since this publication, was well known for his many studies in epilepsy, for a long continued interest in the problems of mental deficiency, and for his contributions in the field of psycho-analysis. In this volume he has endeavoured to throw light on some of the problems relating to mental arrest through the use and application of psycho-analytic principles and knowledge. He also makes suggestions as to training-treatment of the feeble-minded, and as to the measures that may guide

us in shaping their mode of life to the best advantage.

The first 40 pages are given over to an elementary statement of present-day psycho-analytic concepts. Following this, the author proceeds to a study of clinical material, and concludes with chapters on the social behaviour of the ament and on the present and future outlook in the treatment of amentia. A glossary is appended which will be helpful to the medical man as well as to the general reader for whom it is intended.

This book opens up new viewpoints in a field which is much neglected, and wherein efforts at understanding would not seem promising to many. It may be that such studies will prove of more value in throwing light on the question of mental growth and development in general than on the practical problems of feeble-mindedness, but on either consideration they merit attention and study.

Allergy in General Practice. Samuel M. Feinberg, M.D., F.A.C.P., Assistant Professor of Medicine, Northwestern University Medical School. 339 pages, illustrated. Price \$4.50. Lea & Febiger, Phila., 1934.

No doubt, allergy still presents many obscure problems and these necessarily must be left largely to so-called allergists. But Dr. Feinberg rightly points out that the general practitioner can and should deal directly with a great deal of allergic disease himself. As might be expected, asthma forms the chief subject of the book; a smaller space is devoted to hay-fever, and the final chapter deals with other allergic disorders. There is a concluding section on case problems which is of great interest.

The book presents no new outlook, but it does deal with the subject very clearly and comprehensively. One particularly useful aspect is that it takes up the sources of various allergies. One has to be a walking encyclopædia of general knowledge to know all the disguises in which a comparatively few substances occur. Wheat flour, orris root, horse hair, nuts, wool, are all fairly common excitants of allergic symptoms. But how many men realize in what a number of sources wheat may be found, or any of the others. And yet treatment in connection with such sensitization is almost always concerned only with removal of these from the patient's environment. In this and other details it will be found that Dr. Feinberg's book contains much valuable information.

The Renaissance of Medicine in Italy. Arturo Castiglioni, M.D., Professor of History of Medicine at University of Padua. XIV and 91 pp. Price \$1.50. Johns Hopkins Press, Baltimore, 1934.

The author of this delightful study is a remarkable and probably unique figure. Not only is he Professor of the History of Medicine in the ancient University of Padua, but he is the head of the sanitary service of the Lloyd Triestino. Professor Henry Sigerist, who writes the introduction, remarks that he does not think there is any other navigation company in the world where the doctor's office resembles an Institute of the History of Medicine. Castiglioni was once asked how that queer combination came about. His answer was: "When you are a doctor the chief trouble arises from your fellow-doctors. I chose the two specialties in which you are sure to remain unbothered. The doctors I am dealing with are either dead and buried or else sailing in far-remote seas!"

Professor Castiglioni's book consists of three chapters embodying the Hideyo Noguchi Lectures for 1933 at Johns Hopkins University. In these few pages (we could wish they were more) we have a concise but stimulating account of that remarkable movement, the Renaissance, which, beginning in Italy, was destined to influence the thought and action of the whole world; against which background we find sketched the outlines of the development of medical and general scientific thought in Italy. Professor Castiglioni

X-rays Assure Early Discovery



Radiograph showing osteogenic sarcoma of femur.

CASES of bone tumors usually offer only an unfavorable prognosis unless they are detected in their earliest stages. For they metastasize rapidly and ultimately produce fatal conditions.

Each type of bone tumor, whether benign or malignant, requires its own particular measures of treatment and accompanying precautions. But in every case the most important single element in the therapeutic

management is a *prompt, accurate, early diagnosis.*

To be sure to detect such tumors at the earliest possible time, refer your patient to your radiologist at the very first suggestion of bone disorder. His radiographs will give you positive information on which to base your diagnosis . . . will permit classification of the tumor . . . will aid in determining the proper treatment.

• If you would like to receive the free publication, "Radiography and Clinical Photography," mail the coupon below.

CANADIAN KODAK CO., LIMITED
Toronto 9, Ontario.

Gentlemen: Please send me your free publication, "Radiography and Clinical Photography," regularly.

Name.....

No. & St.....

City.....

Province.....

RADIOGRAPHS PROVIDE DIAGNOSTIC FACTS

thinks, and rightly, that the history of medicine is but one aspect of the history of civilization and cannot be properly studied apart from its relation to general culture. The application of this conception to the subject in hand has resulted in a learned but at the same time a discerning and philosophic study that holds one's attention from first to last.

The first lecture is dominated by the gigantic figure of Leonardo da Vinci, artist, anatomist, physiologist, biologist, mathematician, engineer, and poet. "As the true founder of the experimental method he determines the canons of modern science and research."

In the second lecture the great anatomists and physiologists pass in review before us—Mondino, Berengario da Carpi, Canano, Vesalius, Colombo, Servetus, and Cesalpino. The last-mentioned is said to be the first to make use of the word *circulation* in connection with the blood. This statement is arguable and has been controverted; English-speaking authorities will think that the author has in this given Cesalpino rather more and Harvey rather less than his due.

In the third lecture Girolamo Fracastoro, physician, humanist, diplomatist, geographer, physicist, geologist, musician, and poet, a man of the Renaissance in the fullest sense of the term, is presented to us as the visionary who was the prophet of the modern science of epidemiology. Truly, we of the medical persuasion owe to Italy a debt which few amongst us have fully appreciated. Professor Castiglioni helps to assure us of this, and does so in a charming way. All interested in the development of our art should read this book.

Practical Medical Dictionary. T. L. Stedman, A.M., M.D. Twelfth revised edition, 1,256 pages, illustrated. Price \$7.50. William Wood, Baltimore, 1933.

Dr. Stedman tells us that there are about a thousand new titles in this new edition, not counting many new sub-titles, and we are quite willing to take his word for it. Only those who devote themselves seriously to collecting and noting medical terms know how prolific is their birth-rate. It would be interesting to know what the mortality is amongst these infants. One would suppose that it was quite high, but is it high enough! It would also not be without interest to know which branch of the medical family produced most terminological fruit, digestible or otherwise.

We have always taken exception to the phrase Dupuytren's *contraction*. Dupuytren himself used the word "*contracture*", and that, as we understand the meaning of the word, exactly expresses the pathological condition concerned. But too often in journals and clinics "*contraction*" is used. We hope that in the next edition of his very excellent dictionary Dr. Stedman will set the surgeons on the right path in this spelling.

We have nothing but praise for this dictionary, for its usefulness and its general "get-up" of printing and binding.

BOOKS RECEIVED

The Cancer Problem and its Solution. Hastings Gilford, F.R.C.S. 59 pages. Price 2/6 net. H. K. Lewis, London, 1934.

The Single Woman. A Medical Study in Sex Education. Robert L. Dickinson and Lura Beam. 469 pages. Price \$5.00. Williams & Wilkins Co., Baltimore, 1934.

Tuberculosis: Infection, Heredity. Auguste Lumière, Correspondent de l'Institut. Second edition revised and enlarged, 261 pages. Published under the auspices of Committee for Distribution of Scientific Books. Price \$2.75. John Bale, Sons & Danielsson, London; Macmillan Co., Toronto, 1933.

Glasgow Royal Maternity and Women's Hospital. Medical Report for Year 1932. 136 pages. Aird & Coghill, Glasgow, 1933.

International Clinics. Vol. I, 44th series. 320 pages. Price \$3.00. J. B. Lippincott, Phila., London and Montreal, 1934.

The Brain and its Mechanism. Sir Charles Sherrington, O.M., G.B.E., F.R.S., Waynflete Prof. of Physiology in the University of Oxford. The Rede Lecture. 35 pages. Price \$0.50. University Press, Cambridge; Macmillan Co., Toronto, 1933.

Bergey's Manual of Determinative Bacteriology. David H. Bergey, formerly of the University of Pennsylvania, Philadelphia. Fourth edition, 664 pages. Price \$6.00. Williams & Wilkins, Baltimore, 1934.

The Harvey Lectures. Delivered under the Auspices of the Harvey Society of New York, 1932-1933. Series 28, 233 pages. Williams & Wilkins, Baltimore, 1934.

Le Traitement de la Syphilis Rénale. A. Sézary, University of Paris. 53 pages. Price 8 Fr. Librairie J.-B. Baillière et Fils, Paris, 1934.

Le Choc en Therapeutique. B. Harvier, University of Paris. 39 pages. Price 6 Fr. Librairie J.-B. Baillière et Fils, Paris, 1934.

Le Traitement des Albuminuries Juveniles. F. Rathery, Prof. of Clinical Therapeutics, University of Paris. 52 pages. Price 8 Fr. Librairie J.-B. Baillière et Fils, Paris, 1934.

Le Traitements Medicaux du Goitre Exophtalmique. Dr. Sainton, Physician at l'Hôtel-Dieu. 48 pages. Price 6 Fr. Librairie J.-B. Baillière et Fils, Paris, 1934.

Venereal Disease. Hugh W. Bayly, M.D., Vice-president, Society for Prevention of Venereal Disease. Fifth edition, 260 pages, illustrated. Price 10/6 net. Chapman & Hall, London, 1934.

Students' Pocket Prescriber. David M. Macdonald, M.D., D.P.H., F.R.C.P.E. Tenth edition, 263 pages. Price \$1.00. E. & S. Livingstone, Edinburgh; Macmillan Co., Toronto, 1934.

Das Wunder der Heilung durch eigenes Blut. Dr. Ludwig Sternheim. 64 pages. Price Fr. 3.50. Published by Hans Huber, Berne, Switzerland, 1933.

British Spas Inland and Seaside Resorts. Official Handbook of British Health Resorts Association. 260 pages, illustrated. Price 1/- net. J. & A. Churchill, London, 1934.

How is Your Breathing? Dr. Ethel Mellor, Association of Royal College of Science, London. 56 pp., price 35c. Methuen & Co., London, 1934.

The Diet Book for Doctor, Patient and Housewife. Marguerite R. Rea. Second edition, 210 pages. Price \$2.00. Oxford University Press, London; MacAinsh & Co., Toronto, 1934.

Volumetric Analysis. H. P. Starck, M.A.(Cantab.), Head of Science Department, Technical College, Kingston-on-Thames. 228 pages, illustrated. Price, \$2.50. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1934.

Secrétion Interne et Régénérescence. N. E. Ischlondsky. 336 pp., illustrated. Price 90 Fr. G. Doin, 8, Place de l'Odéon, Paris, 1933.

When Baby Refuses Vegetables - -

recommend

CLAPP'S Original

BABY SOUPS and VEGETABLES

in the new

Enamel Purity Pack



Now
15c
Each

WHEN it's time to add vegetables to the diet of your little charges and Mother complains that her Baby refuses **STRAINED** Spinach or Home-cooked vegetables — suggest Clapp's — for babies quickly take to these infant foods and thrive on them.

Clapp's Baby Soups and Vegetables are specially prepared for infants from fine selected vegetables and fruits — cooked in glass lined kettles — air-tight to protect vitamins and mineral salts — silky smooth, and unvarying in "feel" or flavour.

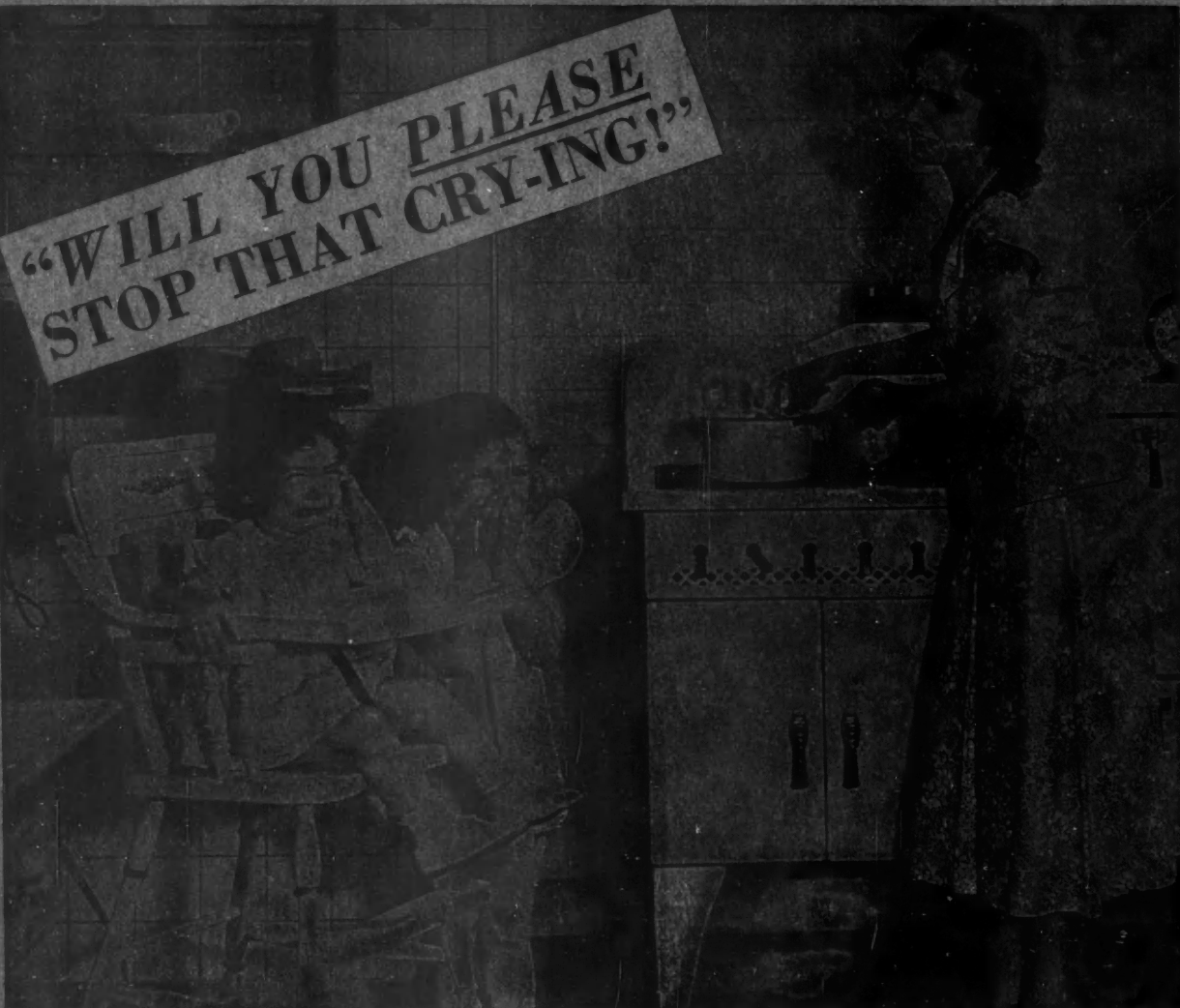
There's no need to hesitate because of price for Clapp's Baby Foods in the new Enamel Purity Pack, are now only 15c. each.

15 VARIETIES

Baby Soup, (Strained or Unstrained), Wheatheart Soup, Beef Broth, Spinach, Peas, Beets, Carrots, Asparagus, Wax Beans, Tomatoes, Wheatheart Cereal, Prune Pulp, Apricot Pulp, Apple Sauce.



HAROLD H. CLAPP CO. LIMITED - 2155 Pius IX Blvd., Montreal



If the tired, worried, over-worked mother were using Pablum for her babies' cereal feedings, she could have slept that extra much-needed hour instead of losing her temper while her children clamor for breakfast. For she can prepare Pablum in an instant, directly in the cereal bowl, simply by adding water or milk of any temperature—salt, cream and sugar for the older child and herself.

GETTING up an hour earlier in the morning is an inconvenience for most persons, but for the mother of young babies it is a hardship, sometimes almost tragic, frequently nullifying the best-planned pediatric advice.

This is especially true in the case of the nursing mother whose supply and quality of breast milk are affected by emotional shocks resulting often in agalactia and sometimes giving rise in the baby to diarrhea, colic, and even convulsions. Furthermore, the mother's emotional stress brings about a train of behavior on her part which is reflected in the child's psychologic reactions so that a vicious circle of bad habit formation is set up.

From this angle, the recent introduction of the pre-cooked form of Mead's Cereal, known as Pablum, assumes new importance in the doctor's

psychological handling of both mother and child, quite aside from its nutritional value.*

Because Pablum can be prepared in a minute, the mother can sleep the extra hour she would otherwise be compelled to spend in a hot kitchen cooking cereal. Added rest means better poise, so that petty annoyances do not bring jaded nerves. Prompt feedings prevent many childhood tantrums, and a satisfied baby usually eats better and enjoys better digestion and growth.

*Like Mead's Cereal, Pablum represents a great advance among cereals in that it is richer in a wider variety of minerals (chiefly calcium, phosphorus, iron, and copper), contains vitamins A, B, E, and G, is base-forming and is non-irritating. Added to these special features, it is adequate in protein, fat, carbohydrates, and calories. Pablum consists of wheatmeal, oatmeal, cornmeal, wheat embryo, yeast, alfalfa leaf, and beef bone.

MEAD JOHNSON & CO. OF CANADA, LTD., Belleville, Ont.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons

